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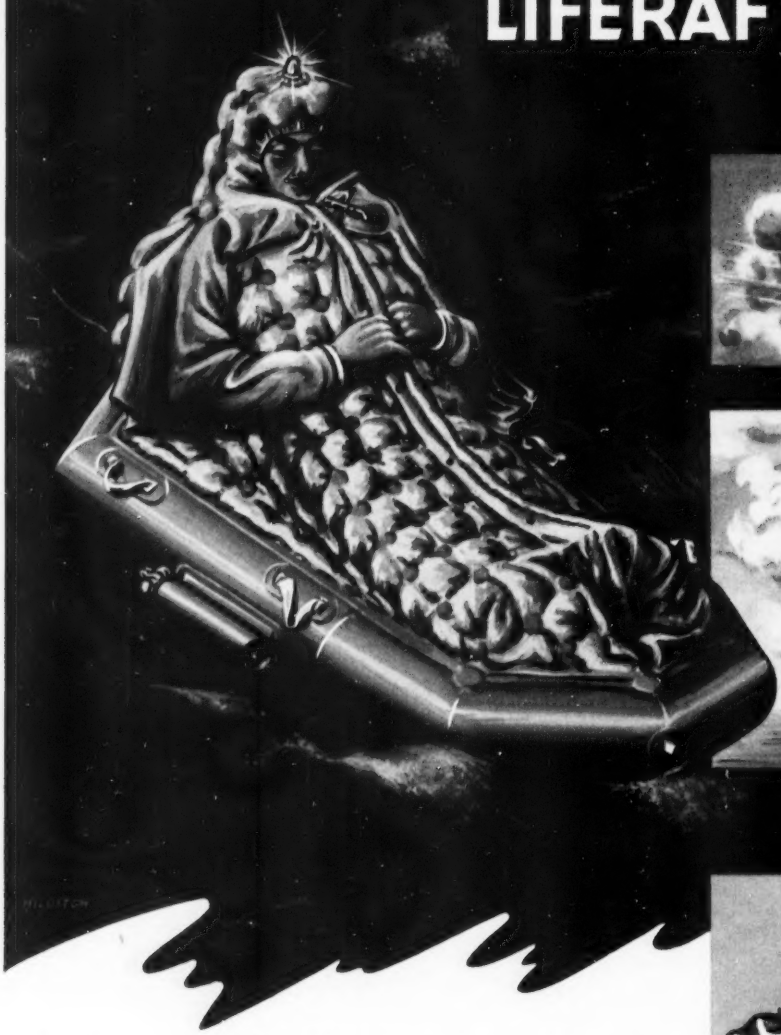

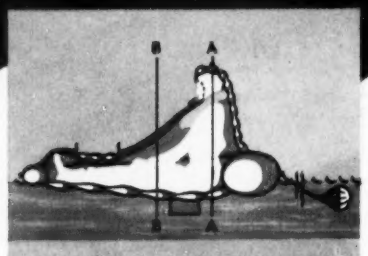

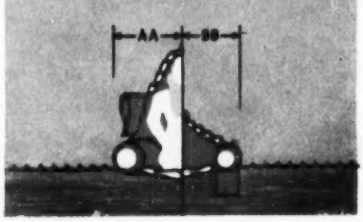

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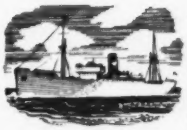
Under two Queens

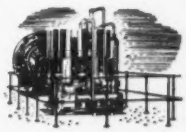
WHEN the name British Thomson-Houston was first heard, in 1894, the main developments in electricity still lay ahead. But progress was rapid. As the Boer War ended, BTH was electrifying the Central London tube railway.

Bleriot crossed the channel in his rudimentary aeroplane—and manufacture of Mazda tungsten-filament lamps began.



The first World War brought a halt to most non-armament development work, but by 1921 the first vessel fitted with BTH turbo-electric propulsion machinery was putting to sea.

The 'flapper' fashions came and went, and in 1930 the first steel-tank rectifier in Britain was installed at Hendon by BTH.



In the second World War BTH research in the new science of electronics, begun many years earlier, gave vital assistance in devising radar warning devices, just as the jet engine — developed at the Rugby Works — altered the course of design in aviation as peace approached.

In this Coronation year, the British Thomson-Houston Company looks back proudly over its record during five reigns, and applies itself anew to the ever-urgent task of supplying industry with the most efficient and reliable electric equipment that can be devised

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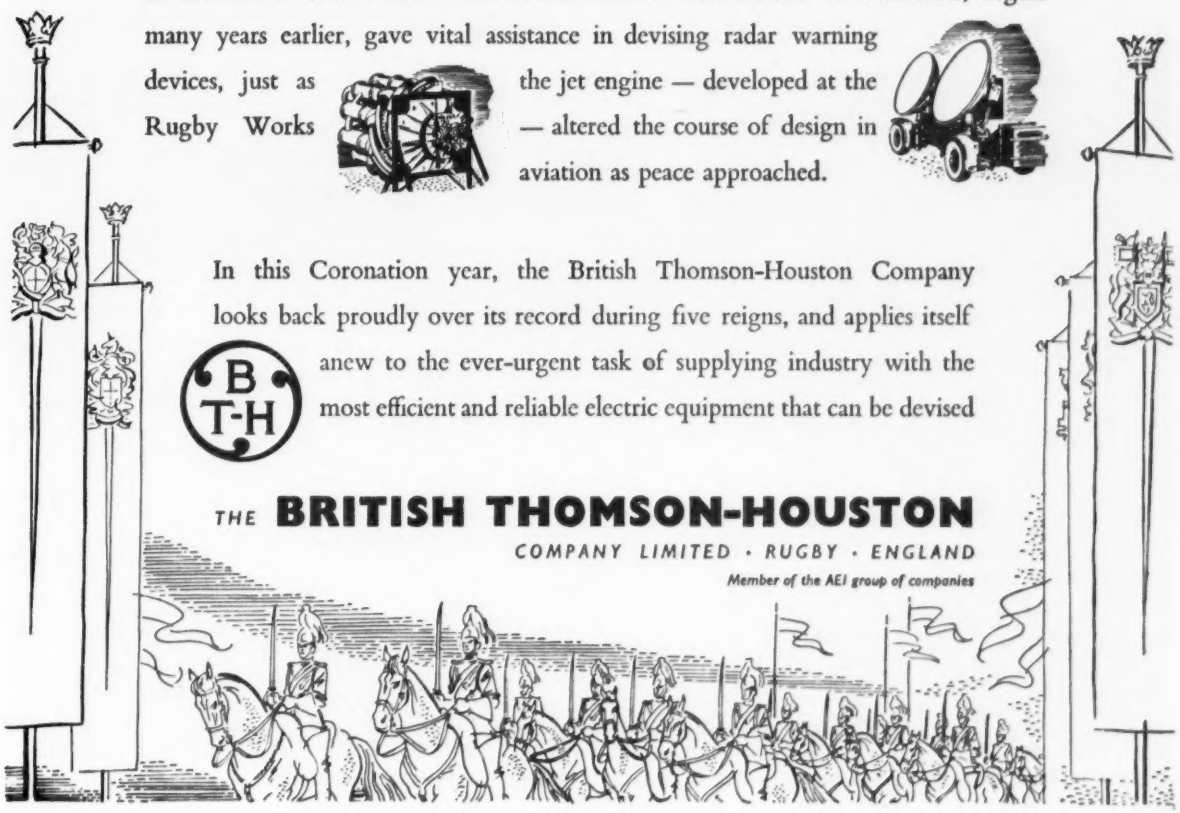

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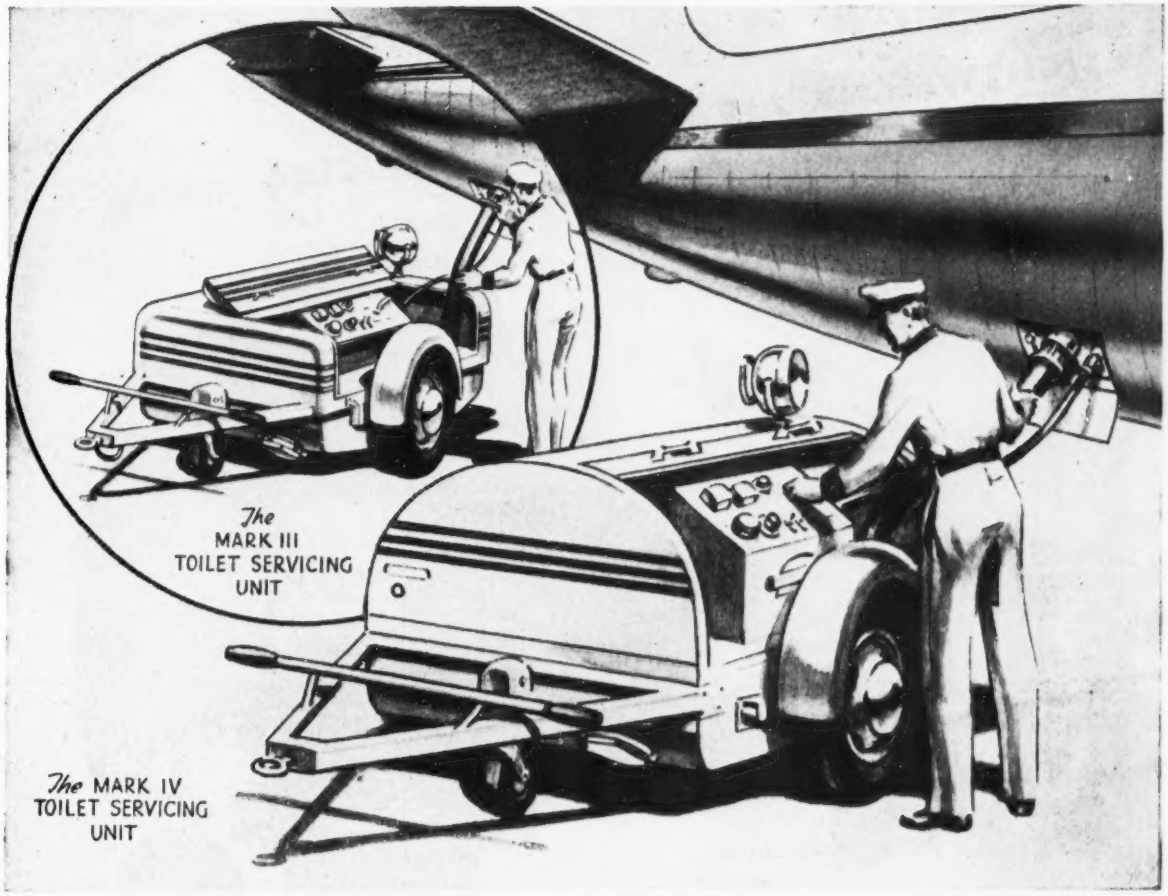

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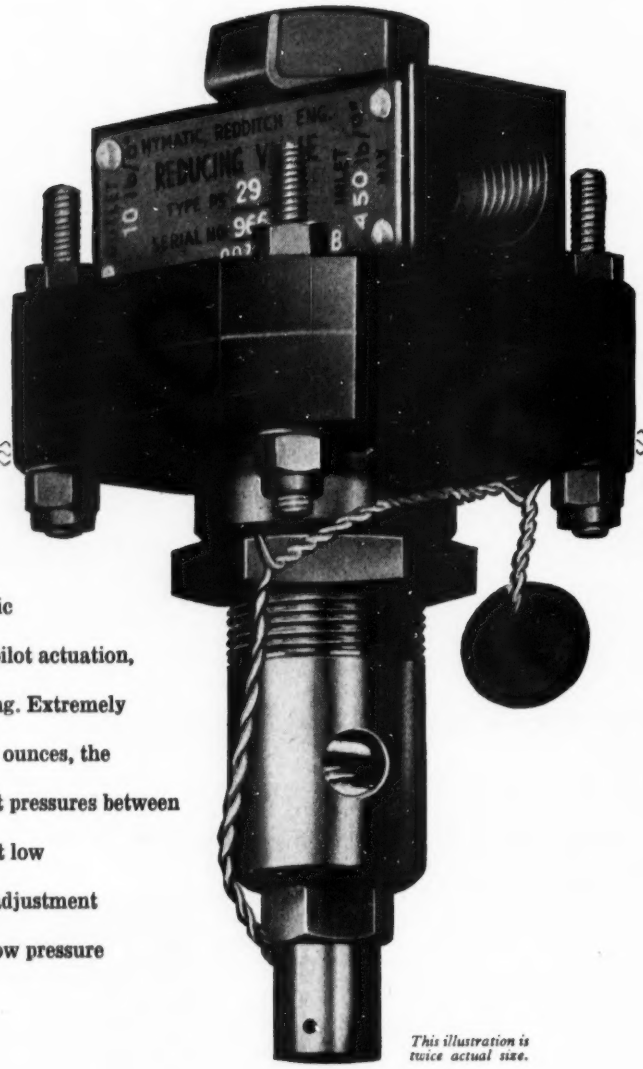

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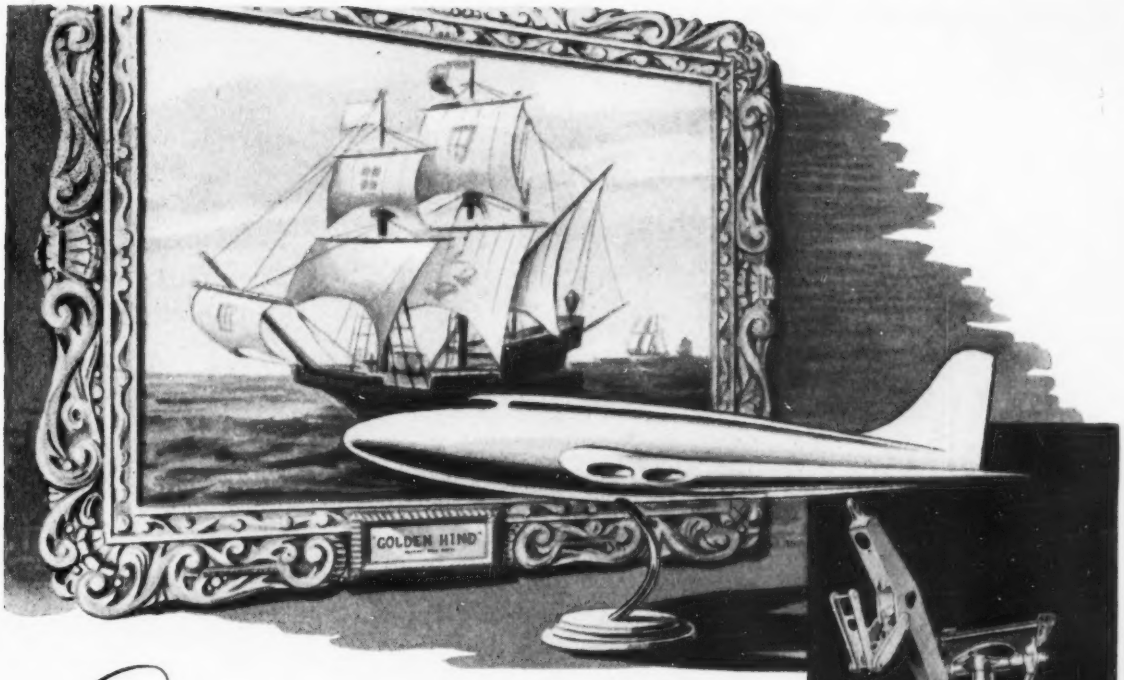

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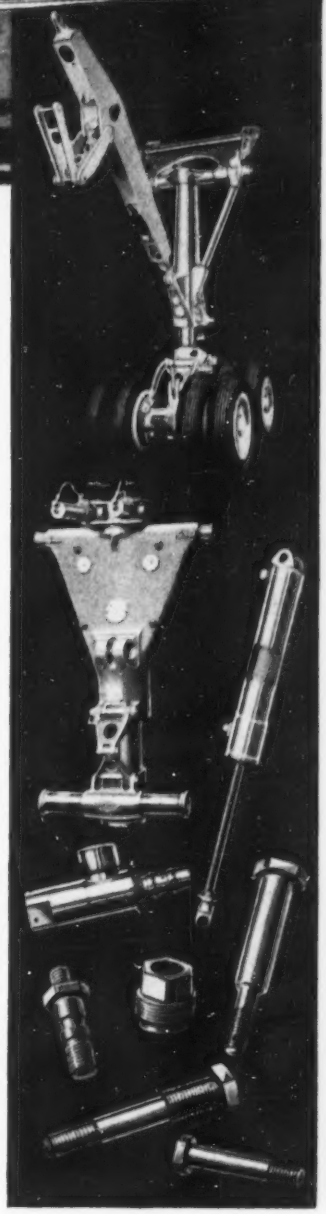

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The Heavens fill with commerce, argosies of magic sails,
Pilots of the purple twilight dropping down with costly bales,

we, like Tennyson, look forward to a future filled with bright promise, a future in which aeronautical progress will set the tempo of the times, a future, too, in which the name of Hobson will continue to play its vital role.

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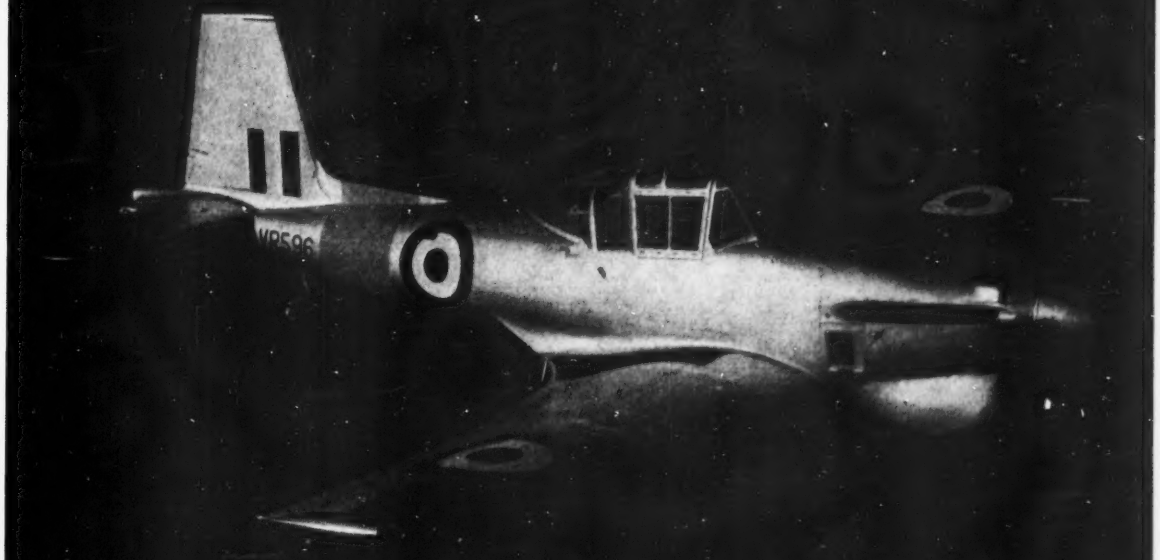

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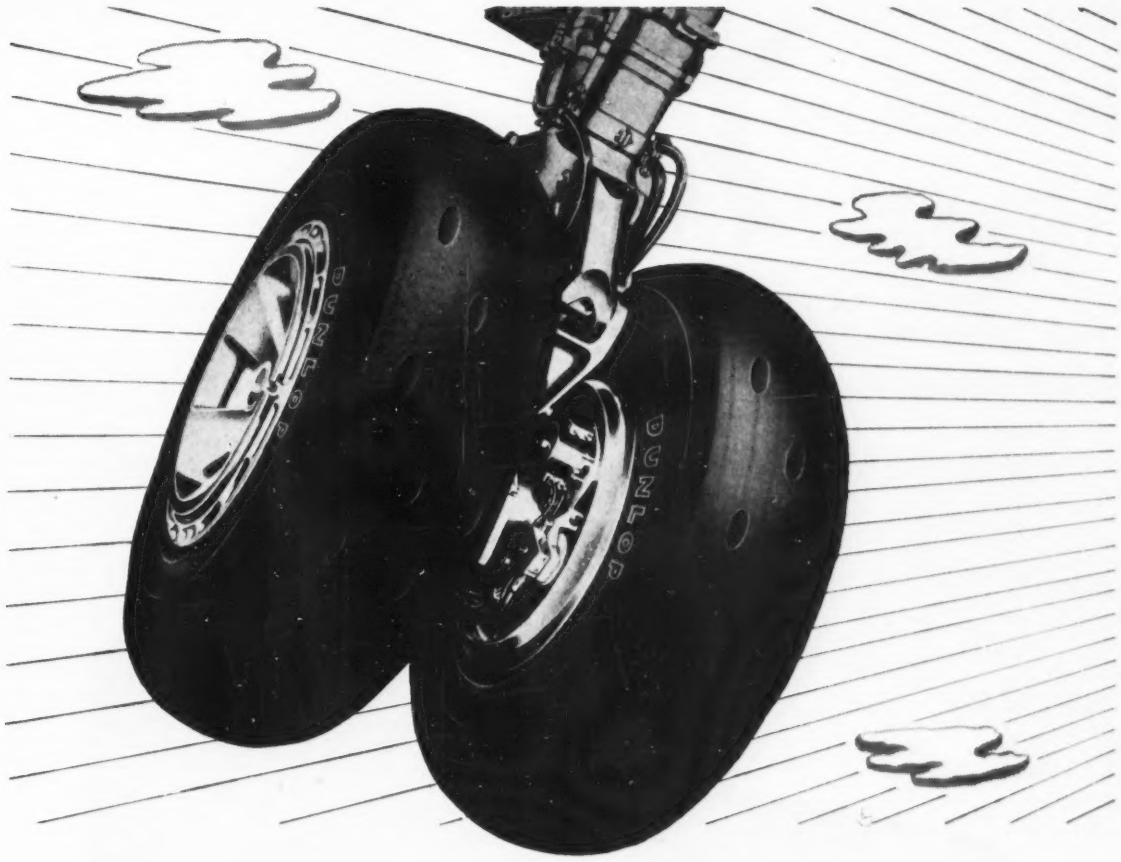

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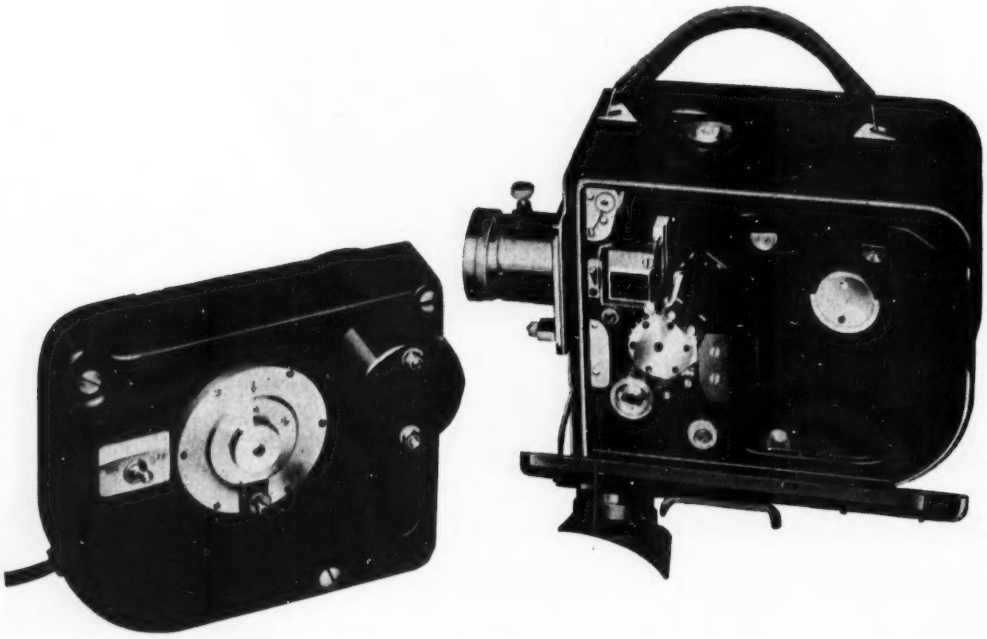

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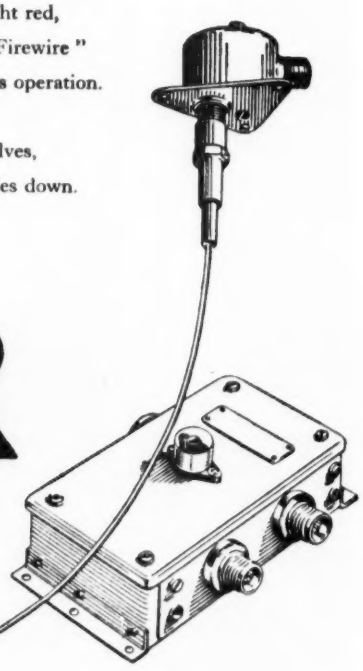

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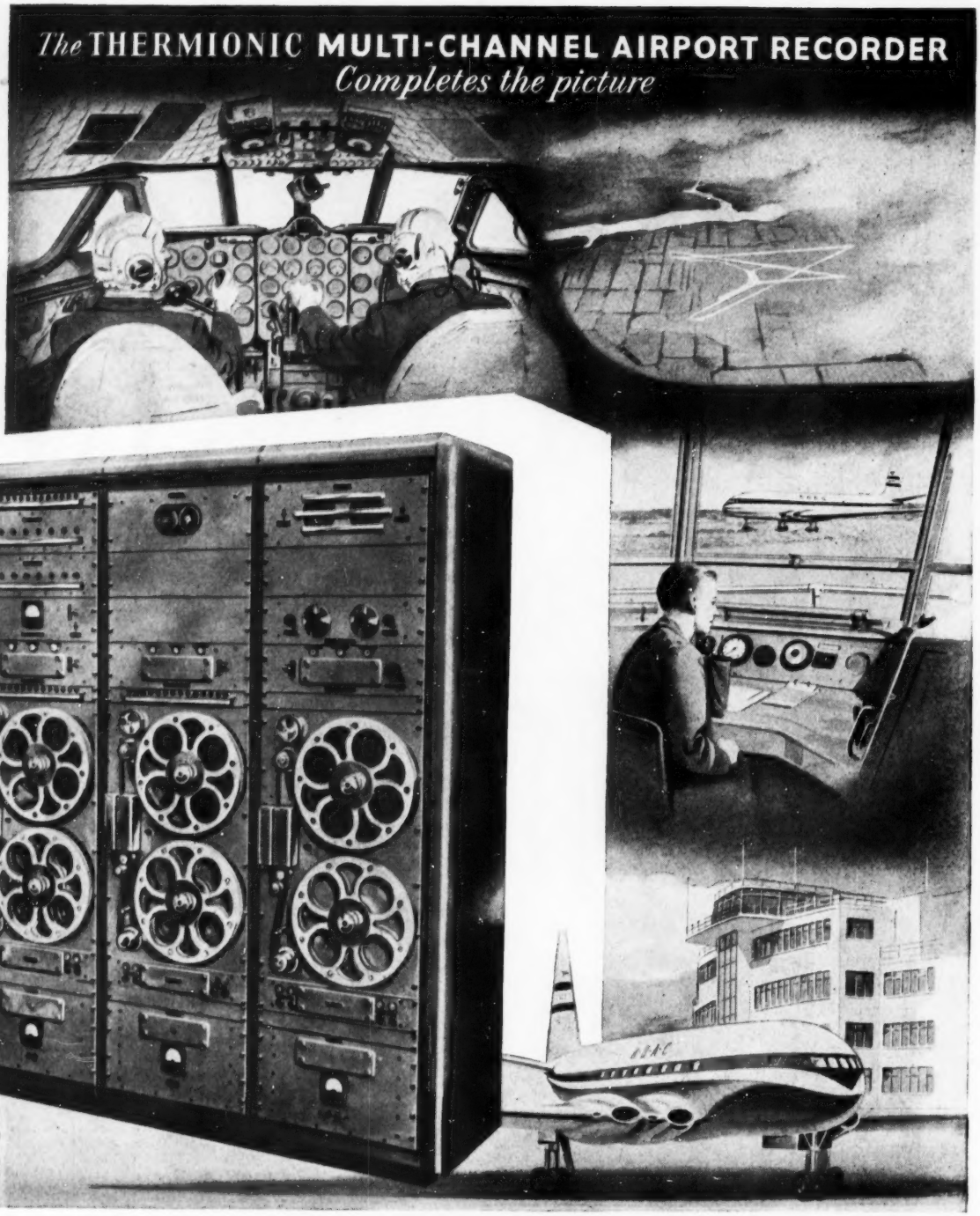

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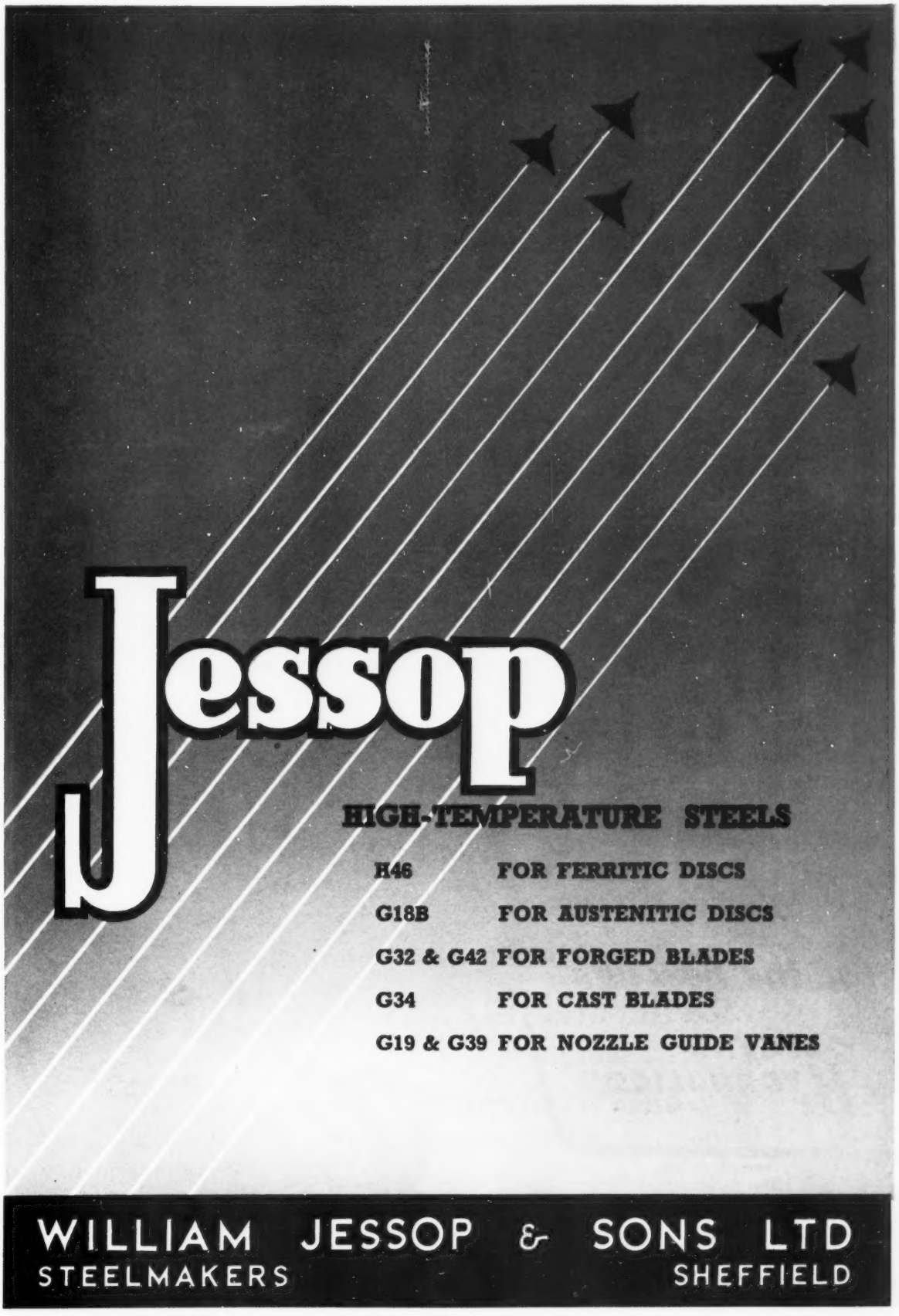
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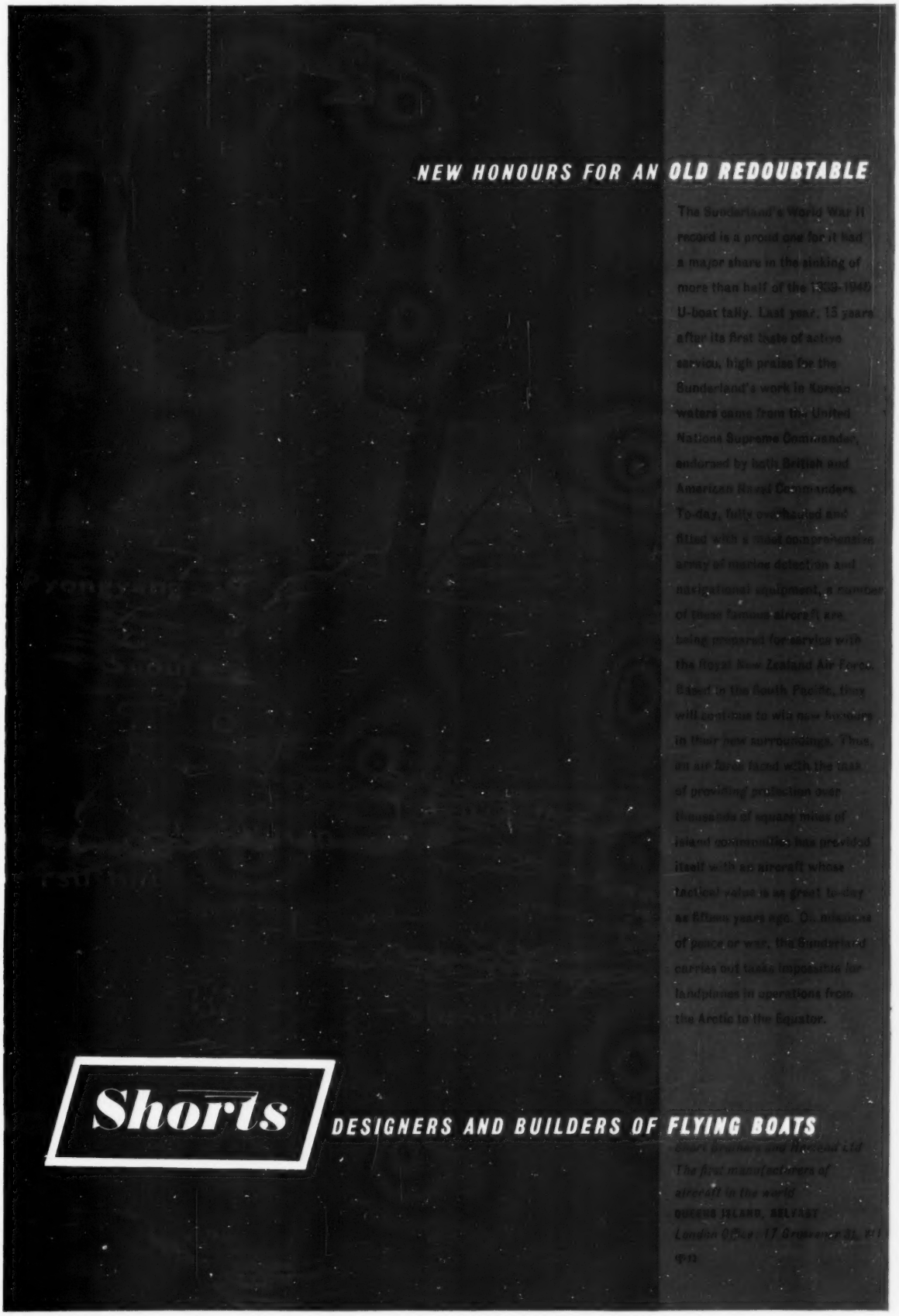

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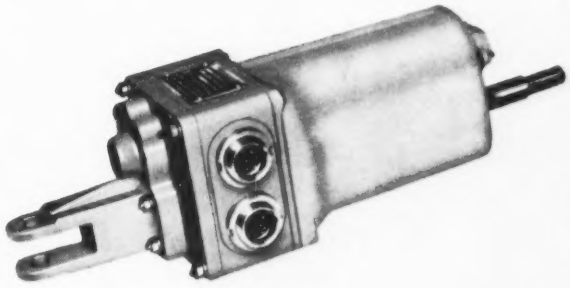

Westminster Abbey has been the Coronation church of England since Harold, last of the Saxon kings, was crowned there in 1066. The present Abbey, except for the chapel at the East end, was constructed early in the 16th century from plans drawn up under the direction of Henry III. In the first half of the 18th century the two West towers were constructed from designs by Sir Christopher Wren. In the heart of the Abbey is the Chapel of Edward the Confessor, which contains the shrine of the saint in whose honour the present building was erected. To the West of the shrine is a modern altar used for the consecration of the oil with which the sovereigns are anointed during the ceremony. Opposite this altar stands the Coronation Chair in which all sovereigns since Edward I have been crowned.

This coronation year the eyes of the world will be turned towards the Abbey and the memorable service which will take place there. As in the past, so in this year, we shall serve the British Aircraft Industry in the remarkable achievements which it has obtained.

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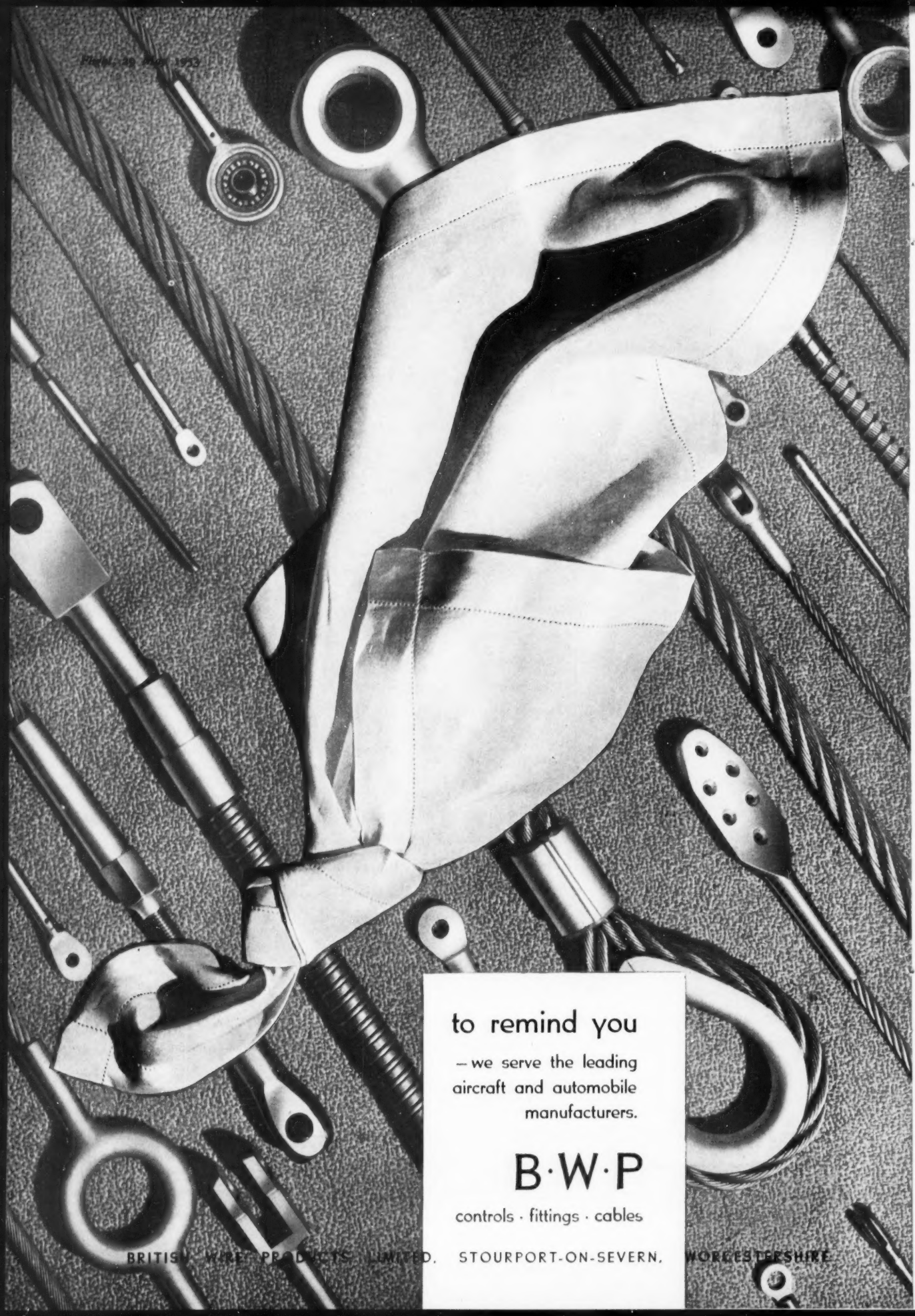
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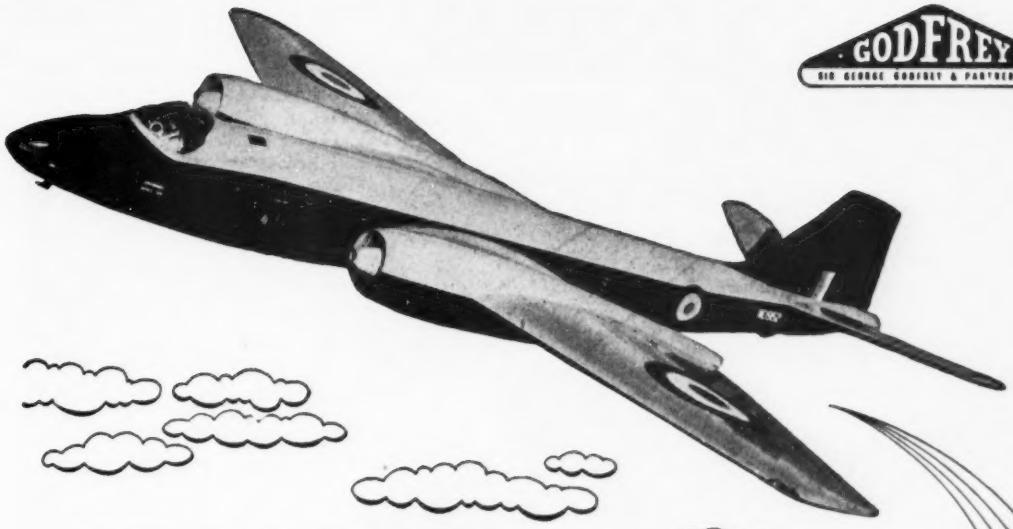

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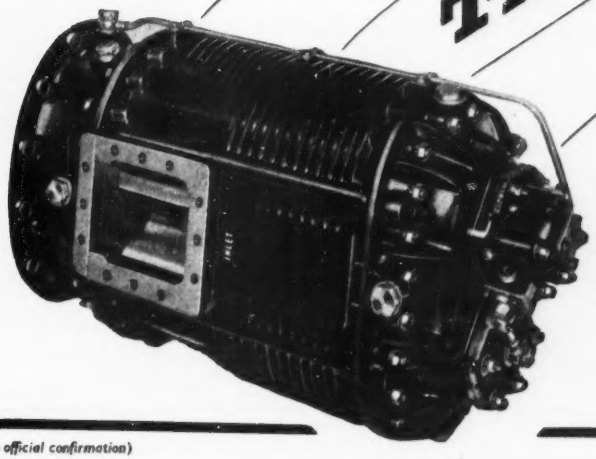

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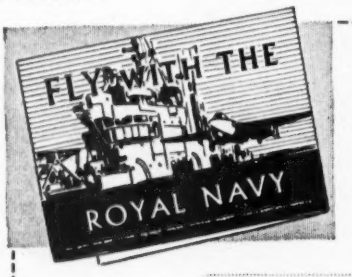

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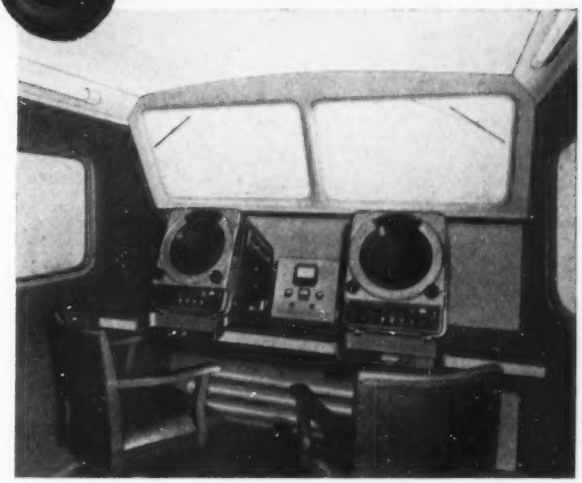

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COMPANY MEETING

THE BRISTOL AEROPLANE COMPANY LIMITED

ANNUAL GENERAL MEETING, 1953

CHAIRMAN'S SPEECH

Ladies and Gentlemen,

The Report of the Directors and the Annual Accounts for the year ended December 31st, 1952, have been circulated and, with your permission, I will take them as read.

BOARD CHANGES

As you will have seen from the Report, two additions have been made to the Board since we last met. At the beginning of this year Mr. W. Masterton and Dr. S. G. Hooker became Directors. Mr. Masterton, who joined the Company in 1939 and who has been Secretary of the Company since the beginning of 1947, has for many years played a leading part in the management of our financial affairs, and we are confident that his appointment as Financial Director will be of the greatest value to the Company. Dr. Hooker, the Chief Engineer of our Engine Division, will bring to the Board invaluable technical knowledge, and we have welcomed both Mr. Masterton and Dr. Hooker most warmly to our number. Mr. J. F. Harper, previously Chief Accountant, has succeeded Mr. Masterton as Secretary of the Company.

ACCOUNTS

In dealing with the Accounts today, I shall refer mainly to the Consolidated Accounts which cover the combined trading results and financial position both of the Parent Company and of our expanding group of subsidiary Companies at home and abroad. These Consolidated Accounts now include a full year's operation of our newly-formed Australian Subsidiary and also of Bristol Aeroplane Engines (Eastern) Limited in Canada.

Profit and Loss Account

All our subsidiary Companies have traded profitably and sales of the Group reached a higher level in 1952 than in any year since the war.

The Consolidated Profit and Loss Account shows that the Trading Profit less Depreciation for the year amounted to £1,455,631, an increase of £105,686 over the 1951 figure.

There is no exceptional item of income corresponding with the award of £125,000 for the use of designs which was credited in the 1951 accounts. The charge for taxation at £922,921 compares with £941,455 in the previous year and, after the inclusion of miscellaneous items of income and expenditure, there remains a net profit of £563,829 against a corresponding figure of £566,573 in 1951.

The taxation charge of £922,921 reflects the recent reduction in the standard rate of United Kingdom Income Tax but this relief is counterbalanced by the sum of £50,000 which we have provided for Excess Profits Levy. As a result the proportion of our profits absorbed by taxation is, at 62 per cent, almost exactly the same as in the previous year.

Balance Sheet

The Consolidated Balance Sheet shows several significant changes compared with a year ago. The net value of Fixed Assets has increased by £1,329,528 to £5,232,755 and outstanding contracts for Capital expenditure amounted to £1,579,250 reflecting the continued heavy capital expenditure which we are incurring in order to be properly equipped to deal with the programmes to which we are committed.

At the same time Stocks have increased by £3,206,603 to £9,354,835 and Debtors are up from £3,207,610 to £4,947,235. These increases reflect both the growth of our output during 1952 and the expectation of further growth in 1953 and later years.

As a result Cash Balances and Tax Reserve Certificates have fallen from £3,381,791 to £740,258 and there is a Bank Overdraft of £682,120 compared with nothing under this heading at the end of 1951. You will also note that we have raised in Canada during the year a sum of $1,200,000 (£449,754) on 5 per cent Mortgage Bonds in order to finance the construction of a new factory in Montreal.

It is to be expected that obligations under our expanding manufacturing programmes will involve a high and increasing level of investment both in fixed assets and working capital, and we expect our indebtedness to our Bankers to be considerably greater in the future than it was at the end of 1952. Your Board have the position under constant review but the present is not in their opinion an appropriate stage at which to seek additional permanent capital.

Appropriation of Profit

It is against this general background that your Board have had to consider the appropriation of profits. They have decided to transfer the sum of £249,914 to General Reserve bringing the total at the credit of that account to £2,750,000.

You will see from the Report that we are recommending a final dividend of 6¼ per cent on the Ordinary Capital of £4,620,000 which, with the interim dividend of 5 per cent on the old capital of £3,300,000, makes the total dividend for the year the equivalent of approximately 10 per cent on £4,620,000.

The gross sum of £459,525 to be distributed as dividend in respect of 1952 compares with an amount of £445,500 representing the total dividend paid in respect of 1951. When making these comparisons it should be noted that the 660,000 5 per cent Preference Shares distributed by way of bonus issue to the Ordinary Stockholders on January 1st, 1953, will be entitled to a gross distribution of £33,000 per annum from 1953 onwards.

REVIEW OF THE COMPANY'S ACTIVITIES

In the years since the war we have been concentrating largely upon transport aircraft and their engines, since it is clear that adequate and efficient air transport is a staple necessity of our country in peace and war alike. We are only at the beginning of the major developments to which we look forward but we are already reaping the fruit of our endeavours as you will readily observe by reference to our several projects.

The Britannia Airliner

Since our meeting last year the Bristol Britannia has made its first public appearance, the prototype having first flown on August 16th, 1952, and having been exhibited at the S.B.A.C. Flying Display in the following month. All who saw her flying were greatly impressed by her attractive lines and her quietness: the progress of flight development justifies our belief that in Britannia we have obtained the qualities of economy, range, payload, and performance, which were the criteria of the specification, which we evolved in co-operation with B.O.A.C. and with the support and assistance of the Ministry of Supply. The widespread interest which is being shown by the leading airlines of the world has already caused us to arrange a 40 per cent increase in the rate of production from our Filton Works.

Further evidence of the confidence felt in and importance attached to Britannia may be found in the "super-priority" classification accorded by the Government early this year to its production. The assembly line is now taking visible shape, and we are planning to make our first deliveries to B.O.A.C. for flight development work in the Autumn of 1954, followed by certification and use on their trunk routes in two years' time. Orders have also been placed by other airlines, and more are in course of negotiation.

The Proteus Turbo-Prop Engine

As so often in the aviation field, the possibilities of developing an aircraft of inherently sound characteristics turn on engine capabilities, and in this respect we have had a most encouraging year's progress with the Proteus turbo-prop engine. In the last two years extensive experience with turbo-props has been gained by practical achievement on the test bench and in the air, our test equipment has been vastly augmented, and a policy of concentration on the development of the Proteus III—an extensive redesign of the earlier Proteus II—has yielded brilliant results. Not only has the first phase of Proteus III development been successfully realized in the Proteus 705 now going into production but we are already well forward with the second phase of development with the series 750 from which we are obtaining substantially increased power. On the strength of the Proteus 750 we have been able to announce a new series of Britannia aircraft possessing further noteworthy increases in payload, range and speed. The new series includes a Freighter version—Mark 200, a larger passenger version—Mark 300, and a mixed passenger and freight version—Mark 250.

Future of Turbo-prop Engines

These developments of the Proteus have a further significance beyond securing the immediate, and so far unparallelled, performance of Britannia. They are practical evidence that the far-reaching merits of the turbo-prop engine can in fact be realized. It is plain that many airline operators who have been ready enough to admit the many theoretical advantages of turbo-props over turbo-jets have hitherto regretfully dismissed turbo-props as only "paper" engines, but recently the picture has changed dramatically, and the progress of Proteus development is being eagerly watched by operators all over the world. And our turbo-prop developments certainly do not end with the Proteus 750. We are ourselves fully convinced that the turbo-prop, whilst retaining its economic supremacy by a wide margin, will soon be capable of providing long distance air travel at speeds of the same order as are likely to be practicable with turbo-jets in normal airline operations.

Freighters

Production of the Bristol Freighter with its two Bristol Hercules piston engines goes steadily on, the rate of output having in fact been doubled during the year: valuable orders have been secured in recent months from old and new customers, notable amongst the latter being Trans Canada Airlines. A new version with extended fuselage has been introduced to meet the special requirement of Silver City Airways for their cross-Channel car ferry service. New possibilities for the use of these versatile aircraft constantly present themselves and we look forward to continued sales for some time to come.

Helicopters

Stockholders will be aware that for short range operations—that is, under 300 miles—we have for several years now concentrated our attention upon helicopters. It will be recalled that our "Rotor-coach," the twin-engined twin-rotor Bristol Type 173, made its first public appearance at the 1952 S.B.A.C. Flying Display. The Type 173 created a big and favourable impression and has resulted in many interested enquiries. Its development is now proceeding. Meanwhile the Bristol 171 five-seater single rotor helicopter—already familiar in Service roles as the Bristol Sycamore—will be appearing this summer in B.E.A. colours on their London—Birmingham service, whilst our collaboration with B.E.A. has also extended to the submission of design studies for much larger craft.

Development of the helicopter demands an effort which is by no means negligible and ultimate success requires the support of the Services on a substantial scale. It is commonly accepted that helicopters possess unique advantages, both in peace and in war. This being so it is unsound to depend too much upon other countries for such essential equipment when it is in our own interest as a nation to depend upon ourselves. In view of the excellent impression which the Bristol Sycamore has created wherever it has been used, we hope to see wider recognition accorded to British-designed equipment in the placing of future orders.

The Olympus Turbo-jet Engine

Our Engine Division has been making extremely good progress with the development and early production stages of the Bristol Olympus two-spool turbo-jet engine, which is currently one of the most economical as well as the most powerful aero-engines known to be flying anywhere in the world today. Evidence of the capabilities of the Olympus has just been provided by the World's altitude record of 63,668 feet accomplished on Monday, May 4th, 1953, by Wing Commander Walter Gibb, our Assistant Chief Test Pilot, in the English Electric Canberra aircraft with which we first demonstrated the Olympus at the last S.B.A.C. Flying Display. Stockholders will, I am sure, join with me in extending warm congratulations to Wing Commander Gibb and all those concerned in regaining this important record. Wing Commander Gibb's success recalls a previous altitude record gained for Bristol 21 years ago by Mr. C. F. Uwins. The Olympus engine—the first British two-spool turbo-jet—promises to be the first of a classic series which will have a long and important future: it will power the Avro Vulcan Delta-wing bomber, and thus make a major contribution to the striking power of the Royal Air Force; its development to considerably higher thrusts than those so far disclosed is of course proceeding at high pressure; its use and application will, we believe, extend further and further both in this country and, through our licensees, the Wright Aeronautical Corporation, in the United States of America.

Guided Weapons

Both Aircraft and Engine Divisions have made encouraging advances in our important guided weapon programmes, and progress to date has amply justified your Board's decision in 1948 to engage in this type of work, provision for which has absorbed a large part of our recent outlays on buildings and plant. At home, the scale of our effort has greatly increased during the year, whilst overseas the stage was recently reached at which we took possession of premises at Salisbury in South Australia as the base for trials at the Long Range Weapons Establishment situated at Woomera.

Motor Cars

The Car Division continues to progress. No doubt you have seen in the Press the recent announcement of our new model known as the Bristol 403. I am glad to report that this car has been well received both at home and abroad. In the Autumn of last year your Company announced its intention of engaging to a limited extent in racing the 2-litre car during 1953. It is our opinion that the experience gained will prove an invaluable addition to the research and development programme already in hand. I cannot leave the motor car side of our interests without mention of the Chancellor's action in reducing Purchase Tax. While this is a welcome relief to the industry as a whole, I must remind you that even at the new rate or 50 per cent we are still carrying a heavy burden.

Other Activities

In addition to the great projects to which I have already referred, we continue in the aviation field to produce the Bristol Centaurus and Hercules piston engines and to contribute to the Defence Programme one of the production lines of Avon turbo-jets; we have a large programme of aero-engine overhauls and by repairing Sabre fighters and their J.47 engines we are assisting the Royal Canadian Air Force in their admirable N.A.T.O. task on behalf of the Defence of Western Europe. In the armament field we have a substantial programme for each of the Services, equipping Bofors guns with Bristol control mechanisms and carrying out a number of other interesting projects. Our subsidiary Company at Weston-Super-Mare had a successful year with its aluminium buildings both at home and abroad, and although the future for these buildings is likely to be affected by credit restrictions, especially in Australia and by the present cost of aluminium, the reputation of our school and hospital buildings continued to bring in new and repeat orders, whilst the activity of the plant has been increased by aircraft sub-contracts and other important Government contract work. During the year our associated Company, Rotol Limited, continued to expand its works to meet growing programmes for aircraft and engine accessories; the demand for Rotol propellers was sustained at a useful level despite the growing use of turbo-jet engines, and Rotol, by acquiring the remainder of the share capital of British Messier Ltd., became wholly responsible for that vigorous and enterprising Company's growing volume of work in the field of landing gear and aircraft hydraulics.

I cannot leave this review without referring to the recent termination of one of the Company's earliest activities. On March 31st, 1953, as a result of the Air Ministry's policy decision affecting many Flying Schools run on a civilian contract basis, our Flying School at Filton ceased operations after 30 years of continuous and successful work. We started training pilots before the first world war, and the Bristol schools at Larkhill and Brooklands are still remembered with affectionate regard by those who years ago learnt their flying with "Bristols." From 1923 onwards the Filton School carried on that tradition and its disappearance is a matter of regret to us all.

OVERSEAS BRANCHES

Canada

The Bristol Aeroplane Company of Canada Limited has had an extremely active year of development: aircraft exports to Canada were encouraging and our two engine-overhaul Companies expanded their turnover satisfactorily. During the year we started to build a new and up-to-date engine overhaul plant for our Eastern Company; excellent progress has been made by the contractors and we have already started to occupy the plant which will be brought into full use during the next three months. We look forward to progressive expansion of our activities in Canada.

Australia

In Australia, the newly established Bristol Aeroplane Company (Australia) Proprietary Limited has made an effective start in the development of Bristol activities in that important continent. I have already mentioned our guided weapon work at Salisbury in South Australia. In addition, as a result of further steps now being taken to consolidate aircraft and engine overhaul facilities in the Sydney area we shall be in a good position to support our aircraft products with first-class after-sales service. During the past year Bristol Sycamore helicopters went into service with the Royal Australian Navy—the latest of many links between our Company and Australia stretching back to "Box-Kite" days.

Europe

Our associated Company in France, S.E.C.A., continues to develop on sound lines, and parallel developments now taking place in Spain are designed to support and maintain the increasing amount of Bristol equipment in service in that country.

PROSPECTS AND PROBLEMS

You will probably agree that the picture we have presented to you today is impressive both in achievement and in prospect. Orders on hand and in negotiation: developments and expansion schemes now being or about to be initiated: longer term projects on which we are working with great confidence—all these promise a colourful future for your Company. But the scale of the effort which we are making is not without hazards and problems and it is right that you should be reminded of them too.

First there is the problem of continuing to provide the technical resources requisite for success. This is primarily a matter of money. To be internationally competitive in the aircraft industry—and it is to be hoped that our would-be nationalizers will realize that this is no sheltered "service" industry but one in which hard international competition is a dominant factor—a large Company must nowadays spend a million pounds or more each year on research and development equipment alone. We need to set aside large sums to provide, for example, for engine testing in altitude conditions, for improving our knowledge of the aerodynamics of supersonic speeds, for obtaining additional development and testing of new materials and new structures, and for countless other urgent developments. Continuing expenditure on this scale is vitally necessary if the aircraft industry in this country is to maintain the advantageous position which it has now reached as a result of the courageous and intensive research and experimental work which it has carried out in the past. Much is said, and rightly, of the technical supremacy of British engineers, but they cannot work without the best obtainable tools and resources. This is possible only if companies are allowed to retain from profits a sufficient sum after taxation to provide the funds required to meet such expenditure, which is recurring and does not by itself directly yield higher production and higher earnings.

Nor are the resources for research and development our only major outlay. The changing character of aircraft and aero engines requires even larger and more complex manufacturing plant, whilst the need to range ever more widely round the world in our export effort necessarily increases selling, servicing and administrative expenses, and adds further demands to working capital. It must be a matter of anxiety to all that the high level of taxation, continuing year after year, should have deprived Industry of so much of its earnings. The recent Budget concessions are welcome, but even more important is the spirit which has prompted them, for relief is needed yet—with the emphasis on incentive for industrial re-equipment—in order that the British aircraft industry may not only retain the competitive position vital to our survival, but may also forge ahead to the high achievements which we know to be possible within the next decade.

A further problem is skilled manpower. We have used every fair and reasonable means at our disposal both to increase the number of our skilled men and to open a wider range of jobs to the semi-skilled. To bring men to the work Local Authorities have assisted us with housing schemes for key workers: to bring the work to the men we have opened two factories in Sunderland and we have recruited there a valuable group of skilled men whose output is supplementing the Patchway Works of our Engine Division. To bring in younger skilled men we have increased the number of our trade apprentices. Each of these measures is getting results slowly—and it is no small factor that the work itself is some of the most interesting and worthwhile in the whole of engineering—but the increase in numbers is far too slow.

This search for skilled men of course is only part of a national problem. We live by our skill—not merely by "increased productivity"—and we do not have enough of it. Employers and employed alike, each individual one of us, has a responsibility to raise the proportion of skill in our factories far higher than it is today. With this in mind your Board are doing all they can to strengthen and improve our recruitment and training programmes: in particular we have started building the new Apprentices Training School to which I referred in my address to stockholders last year.

In this connection it is gratifying to report that the last few years have seen a steady rise in the standards, scholastic and general, of our trade and engineering entrants—a vital factor since we rely for skilled men to an ever increasing extent upon our own training schemes.

No review of prospects and problems in this Industry today would be complete without reference to the anxiety which we, like so many others, feel regarding the rising costs of production. Whether it is the basic rates of pay in the engineering industry itself (let us hope that wiser counsels will prevail over those who are so determined to press another unrealistic claim), or the ever rising costs of the services upon which we depend, the engineering industry cannot in the competitive markets of today earn a major share of the country's bread and butter if costs are constantly forced higher and higher. The time has come for much wider realization of this fact and for the exercise of the restraint which commonsense demands.

Each of these matters—the availability of technical resources and of plant, the search for skill and the need for stability in the costs of production—is a familiar theme. But each is vital to achievement and none can be too often stressed. We have a great task ahead, and there are many risks inherent in it, but we also have a great opportunity. I hope, and indeed I believe, that we shall be worthy of the trust which has been placed in us.

It is my custom to conclude with an expression of thanks to our employees for the willing and enthusiastic service which is so vital in bringing success to the Company. I do on your behalf express those thanks—not just to all for the work they are paid to do, but more particularly to those (and I am glad to say they are many) both on the Staff and in the Works who really care about the achievements of the Company and who will always put out on its behalf that last ounce of effort that is the secret of success. We try to see that they get their material rewards. We hope they also know that the Company is as proud of them as I believe they are of the Company.

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First Aeronautical Weekly in the World

Founded 1909

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Sovereign of the Air Age

OUR issue this week commemorates a splendid occasion and one unique in living memory: the Coronation of a young and lovely Queen—Elizabeth II.

Many have already sought to associate her reign, as yet so brief, with that of her royal namesake Queen Elizabeth I; and, though the personality of our present Queen could scarcely be less like that of her ancestor, the analogy is not inappropriate.

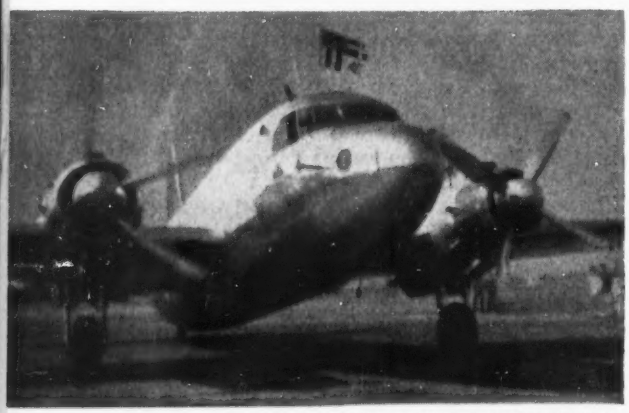
The last half of the sixteenth century is with justification remembered as a golden age when this nation and country rose to greatness through the efforts of wise statesmen, brave seamen and soldiers, and industrious and thrifty merchants. Today, men of comparable foresight, bravery and skill offer us hope for the preservation of our nation's greatness and mature influence for good. But to their numbers must be added the scientists and engineers and those who sail the air in the products of their skill.

As much now as in the days of Drake and Raleigh, the merchant fleet stands firm behind the battle line, indispensable alike for reserve and supply. And today the merchant service of the air shows every sign of becoming as great as, and even more potent than, the merchant marine. Thus, in choosing The Queen's Air Forces as the theme of this Coronation number, we may justly associate with them the Queen's Merchant Air Service and all the Queen's aviators.

That it is in some strange way satisfying to draw parallels with a glorious period in the past should not be permitted to divert one's thoughts from the aspirations and plans for the future. We would wish our young Queen the wise far-seeing counsels that will ease her responsibilities—such service had much to do with the prosperity of that earlier golden age. We believe that, should they be called upon, her airmen, soldiers and sailors—better trained and better equipped than ever before—will prove more determined, more resourceful and, if possible, even braver than those before them.

Although in stating this conviction we have foremost in our minds valour in the profession of arms, the young men who test and prove aircraft, at Boscombe Down, Farnborough and elsewhere, exhibit these same qualities in a different, calculated degree in their day-to-day work.

In this vastly complicated life today a premium is often placed upon experience long in the gaining. This is a good thing unless it excludes the vigour and clear thinking of youth. Drake was a captain of his ship at 22; at 34 Sir Richard Grenville commanded a fleet of seven ships; Raleigh was knighted for his exploits when 32 years of age. If there is to be a second golden age it will be primarily a golden air age. The air is essentially the medium of youth and high spirits with which in today's aircrew captains wise training has contrived to combine a maturity of judgment and a sense of responsibility which belies that youth. Above all, the inspiration we need, and the embodiment of these qualities, is found in Her Majesty, on June 2nd to be crowned Queen Elizabeth II.



A Vickers Viking of the Queen's Flight.

His Royal Highness the Duke of Edinburgh taxies in from solo flying practice prior to receiving his Wings from the Chief of the Air Staff.

This Coronation Number . . .

OUR intention is that this issue of *Flight* shall speak the thoughts which have impelled us to compile it—thoughts which are foremost in the minds of all Her Majesty's subjects at this glorious time. It is an expression of our loyal duty to the Queen and a salute to the men and women of her Air Forces. Especially we take pleasure that it should sound a rare note of romance and present a splash of colour the like of which, we believe, has not previously been seen in a technical journal. That its main theme should be the Air Forces overseas will not, we think, occasion protest among those more familiar branches of the Services whose activities are chronicled week by week in our columns.

Though the six-week tour entailed in collecting material for the Middle East/Far East section was of unprecedented thoroughness, more of the story yet remains to be told. First, it will be seen that the Canal Zone is not accorded its rightful place. For this fact responsibility lies not with the Air Ministry or the Middle East Air Force (who, indeed, spared no pains to ensure the success of the tour), nor even with the author. The reason—and we record it without acrimony at this time—is that certain foreign authorities refused the necessary visas when the object of the tour was made known to them. Similarly, the Far East Flying-Boat Wing and Commonwealth units in Korea receive but scant mention, though many thousands of words and a sheaf of photographs concerning them lie immured in the Pentagon at Washington. On this score we need say no more—except that their deliverance from exile is expected weekly.

"Diplomatic" rebuffs and censorial setbacks notwithstanding, we shall accord due recognition in future issues to the apparently "forgotten" units.

Meanwhile, we present this Coronation Number with pride and pleasure appropriate to the occasion.

THE QUEEN'S AIR FORCES

MIDDLE EAST AND FAR EAST

BY H. F. KING, M.B.E.

ILLUSTRATED WITH "FLIGHT" PHOTOGRAPHS

"I'M F/L. Coates, the captain of the aircraft. The weather is quite good and we should make Luqa, Malta, in 5¼ hours."

With this to-the-point introduction, effected as the speaker came aboard Hastings WD497 at Lyneham on a bleak Sunday afternoon last February, it seems appropriate to open this account of a 32,000-mile tour of R.A.F. stations and outposts; appropriate, that is, not only in order of chronology, but for the characteristic directness and friendliness of the words. These were qualities which stamped the R.A.F. wherever we found it—and we found it in some very strange places indeed.

Air Chief Marshal Sir Arthur P. M. Sanders, K.C.B., K.B.E., C.-in-C., Middle East Air Force.

Out over France the skipper sent word inviting us forward, and as the Hastings sped southward from a deadly English Sunday afternoon we lorded it in the second-dickie's seat. It was a welcome change, for the rearward-facing prospect of a Hastings trooper offers little inspiration beyond luggage racks, ropes, haversacks, and enamel mugs; furthermore, we were able to satisfy a long-harboured curiosity concerning those slips of paper with which a Transport Command captain is plagued, even after George has taken over. A typical one gave this exclusive information: "Endurance 7 hr, AMPG .95, fuel left 1,141. GPH 201."

The Hastings landed at Luqa in dark and rain, and we were already deciding that England wasn't such a bad place after all (even on a wet Sunday) when G/C. N. C. Odbert, O.B.E., the Station Commander, advanced out of the blackness to greet us and conduct us to the mess. The brightness of that institution was enhanced by the presence of a certain F/L. Buckley, who emerged from behind his cigar to recall how he had flown us over the Ruhr in a 4 Squadron Mosquito years ago, and to impart the happy news that he was captain of the M.E.A.F. Valetta in which we should be journeying for the next fortnight.

Our first concern was the R.A.F. in Malta—the George Cross island, the unsinkable aircraft carrier of the Mediterranean, the frontier between Europe and the Middle East. . . . Describe it as one may, its imprint on history can never be effaced. As for its future as an R.A.F. base, this must be influenced by the workings of NATO. Already the Malta-based squadrons are working closely with the navies and air forces of the Western Powers and joint manuœvres have proved a heartening success.

One of our earliest calls was on W/C. D. S. Wilson-MacDonald, D.S.O., D.F.C., the sector commander at Valetta; and naturally one of the main themes of our talk was this linking-up and working-up with the NATO forces. Rome, Bari and Bizerte, it seems, are names almost as common in the air-talk of Malta as are Lyneham, Habbaniya and Fayid; and not the least important aspect of this intimate liaison with France and Italy is the extended early-warning of air attack on Malta itself. The wing commander spoke of the personal friendships growing up between the officers responsible, and he recalled how Col. Pilota Zucconi had confessed to having experienced a decided twitch on his first post-war flying visit to Malta—his previous 40 calls having been made in Ju 87s.

When we drove through the streets of Valetta to pay our respects to the A.O.C.—A.V-M. B. V. Reynolds, C.B.E.—we saw that soft Malta sandstone was healing the scarred face of this venerable capital.

Later we heard, from Flt/O. S. R. McPherson, Officer i/c W.R.A.F. (Malta), how her little force—the only one of its kind overseas, and at that time numbering 26 Maltese volunteers—was "pressing on slowly." Commissioning of a number of girls, who are trained as fighter plotters and telephonists, had been approved in principle. A glimpse of the little office wherein Air Marshal Sir Hugh P. Lloyd directed Malta's defiance of the German and Italian bombers (it now serves as the M.T. office) reminded us that women fighter-plotters and telephonists are very important people indeed.

The men of Malta have an opportunity of playing a part in their island's defence by serving with R.A.F. (Malta). The S.P.S.O., S/L. A. G. W. Livingstone, D.F.C., told us that the force was formed two years after the war with the object of employing locally enlisted Maltese on restricted engagements—as cooks, drivers, admin. orderlies, and so on. No distinguishing flashes are worn (as on the uniforms of the Royal Malta Artillery) and about a third of the men now serving were R.A.F. regulars during and before the war. Doyen of the force is F/Sgt. Aquilina, B.E.M., the A.O.C.'s driver, with 19 years' service to his credit.

Out at Luqa we looked in on a maritime reconnaissance squadron commanded by S/L. E. D. T. Norman, who, strangely enough (but by no means illogically), proved to be a navigator. The squadron shares its base with a second M.R. unit (having regard to the keen inter-squadron rivalry perhaps "another M.R. unit" would be safer), similarly equipped with Lancaster M.R.3s. Also on the station are the Communications Flight; and—as often as not—visiting R.A.F. detachments.

(Below) A Vampire at Takali, Malta. (Right) Pilots and ground crew of a Malta-based Vampire squadron. Pilots (foreground, left to right): Sgt. L. Buckingham; F/O. A. L. Bennett; F/O. G. H. Jarvis; F/L. R. L. Mills; S/L. M. C. S. Shepherd, O.B.E. (officer commanding); F/L. G. G. A. Davies, D.F.C.; F/O. J. F. Gale; P/O. B. B. Long; and Sgt. J. H. Kirk.

F/L. Buckley, captain of the Valetta which carried "Flight's" representatives round M.E.A.F. stations. (Right) The Nile—"a blessed sight."

Middle East and Far East . . .

Based as it is, the squadron is well provided with submarines and surface craft with which to train in its operational rôles. Visits to the armament camp at Nicosia, night-bombing practice, fighter affiliations with the local Vampires, G.C.A. training at Naples, and long-range navigational exercises (including Atlantic trips 400 or 500 miles out from Gibraltar) are routine; and every six months a Lancaster is detached for a flight down to the Kufra Oasis, 600 miles inland from the North African coast. The passengers are meteorological observers and Government officials, and when, with Lancaster crew-members, they visit the local sheik, a "duty feast," complete with sheep's eyeball, is laid on.

One of the squadron's responsibilities being search and rescue, a Lancaster, equipped with Lindholme gear, is maintained on a 24-hr watch. Airborne lifeboats are also on hand, but these are not dropped until the Lindholme gear has been put down and an accurate position established.

An "M.R." Lancaster crew numbers seven, and the menu on long sorties—up to 11½ hr—is less epicurean than that enjoyed on the later, larger Shackleton. Sandwiches, rather than eggs and bacon, are the diet; but a brew-up of tea or soup is a comfort and consolation.

In addition to being a key operational base, Luqa is an important staging post on the Middle East and Far East transport and ferry routes, which means heavy responsibility for the Technical Wing. The Malta Communications Flight is under the command of F/L. R. Jenkins and is equipped with a very distinguished looking Valetta C.2 wherein the C.-in-C. Mediterranean, the A.O.C. Malta, and their staffs are transported about their business. It wears a blue band inscribed with its name—*La Valette*.

The next airfield we visited in Malta was the Royal Naval Air Station at Takali (H.M.S. *Goldfinch*), commanded by Lt. Cdr. Malleson, R.N., and occupied by a famous R.A.F. day fighter/ground attack squadron led by S/L. M. C. S. Shepherd, O.B.E. This unit is a fine example of the go-anywhere, tackle-anything Vampire 9 squadron of which the R.A.F. has a number overseas, and it has been on hand in most of the recent crises in the Middle East area. Very high proficiency has been developed in the art of quick moving from one base to another, and the twice-yearly visits to Nicosia for armament practice are excellent tests of this ability. Up to seven Valettas may arrive from Fayid at dawn and be in Cyprus with 130 ground crew, servicing equipment, spares, jacks, chocks, stone-guards and covers the same day. The squadron tries not to depend on other stations except for fuel, and wherever it may be ordered its Army Ground Liaison Section will follow.

Typical training commitments are G.C.I. practices with the Malta stations; ground-attack practice in North Africa; mock rocket and dive-bombing attacks on naval vessels in the Mediterranean; and air firing against a banner target towed by a Meteor 7. In the big NATO exercises the Vampires have been matched against some unusual "enemy" types, and S/L. Shepherd recalled a number of victories over U.S. Navy Banshees. There is real excitement, too, in the mock shipping strikes, and the pilots often feel the blast of a cruiser's dual-purpose armament firing 100-ft. break-up shot.

As a jet-fighter base, the squadron leader remarked, Malta has the deficiency that forced landings are ruled out by the frequent occurrence of 4ft stone walls. Ditching is not a recommended procedure, so a bale-out is indicated in the rare event of a Goblin failure or similar predicament. The drill is to trim well forward and roll the Vampire on to its back (which reminds us that the C.O. himself leads the aerobatic team, and that as a "party line" the whole squadron will form its two-figure number—at night, with nav. lights on).

There is a fine spirit in this squadron, not among the pilots alone but among the ground crews—"the best in the Middle East" the C.O. assured us, with South African staunchness. The regard of a French Vampire unit for this R.A.F. counterpart is expressed by a Croix de Guerre and a Medaille Militaire which grace the mess. There is a superscription to the effect that they were presented to the squadron by Capt. Mesnard and Lt. Le-Scouezec, French Air Force (Bizerte) on the occasion of their visit to Takali to take part in Exercise DXM in August, 1952.

Our last call was on the Malta homer station, which has achieved a very high reputation among Service and civilian pilots. Of standard R.A.F. pattern, the homer is above the sea and often "works" aircraft at freak distances. One log entry we saw read: "bearing 118, height 11.5, miles 625." We were also shown a letter from Airwork, Ltd., to the "Staff of the Malta Homer," thanking them for their excellent work in connection with the Hermes down off Trapani last year. There is little glamour about these homers, but, truly, the R.A.F. would be lost without them.

Our Valetta taxied out early in the morning past a dainty pair of Hornets staging through to the Far East. F/L. Buckley sighed, murmured "Little beauties," and resignedly set about the cockpit checks of his "pig."

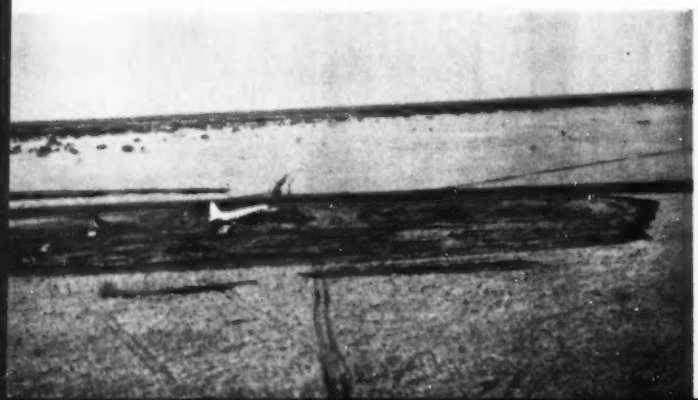
At 178 kt true we headed out across the Mediterranean for El Adem. There was little to entertain us but water and sand, though we did sight a tangle of war-time tank tracks. "Buck" said a geologist had told him that they would remain visible from the air for ever.

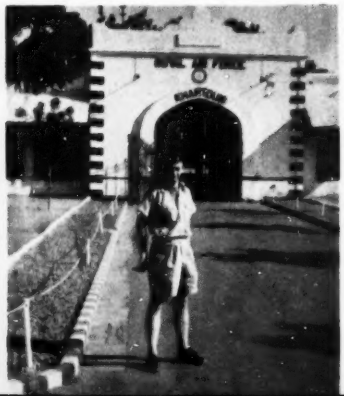
El Adem, we found, has three 2,000-yd runways (two all-weather, one sand), and it is well equipped to take care of visiting aircraft, their crews, and passengers. The dining room can cope with 400 meals a day, and during heavy troop movements to the Canal Zone last year it served 1,500 meals (every one guaranteed square) in two days. Its busiest morning was that on which a French Dakota, eight R.A.F. Valettas, four Mosquitoes, five Meteors and three Furies called in. Within 1 hr 40 min all but the Meteors and Furies had refuelled and departed.

Mr. Gifford, the senior met. officer, told us of one of the station's unusual and important responsibilities—that of servicing the generators and other equipment for the met. outposts at Giarabub, Kufra, Jalo, Benina, Cyrene and Derna, which send in their reports every three hours.

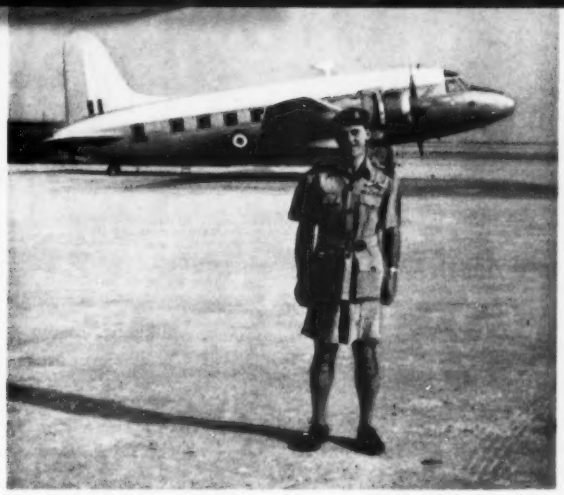
We were concerned to notice that the occupants of the D/F. huts and vehicles disposed around El Adem perimeter had been issued with Sten guns. Batteries, it seemed, had taken to walking out of Babs vehicles—and even cable alarms could not arrest this unaccountable exodus of Her Majesty's stores.

The local Arabs (with whom no association of the aforementioned phenomenon is, of course, intended) are by nature acquisitive, and they harvest the shells, bombs and mines which still abound in the surrounding desert. Remarkably enough, the

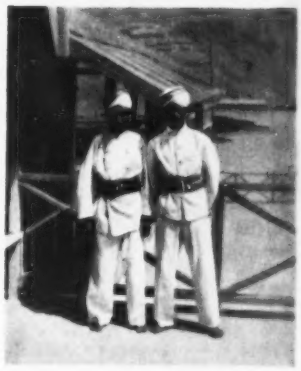




(Extreme left) "R.A.F. Jebel Mageinis"—salvaging a Valetta from the desolate Sudan scrub. Seen at the entrance of what was originally a barracks for Kitchener's troops is W/C. E. F. Pippet, Officer Commanding, R.A.F. Khartoum.



(Upper left) S/L. J. R. Wood D.F.C., commanding the Aden Communications Squadron (Valettas). (Above) W/C. C. R. A. Forsyth, D.S.O., Officer Commanding, R.A.F. Khormaksar with S/L. D. B. Bretherton, D.F.C., commanding a Khormaksar-based Vampire squadron. (Top right) An N.C.O. of the Aden Protectorate Levies. (Right) Mess waiters Aden.



explosions are not always fatal. The one we witnessed ourselves was too distant for us to observe any anatomical disruption.

The Bedouin, incidentally, will accept no money for aiding distressed pilots; but they do ask for a chit recording their good deed. This they will exhibit in time of need, and W/C. F. M. Thomas, the station commander, told us that he had recently paid £1 to a wanderer who had produced from an old tin a paper certifying that he had assisted a baled-out Vampire pilot.

One of the most interesting of the component units is the Desert Rescue Team, comprising one Anson, flown by the wing commander himself, and two Matador vehicles equipped with R/T., W/T., and with fuel capacity for over 700 miles. On a trip into the blue the Matadors carry their own supplies and medical stores, and navigate by their E.2, P.12 and Coles sun compasses. A local gentleman called Chico interprets and helps with his knowledge of the desert. The Anson will take five 125-lb supply containers, and these (the door having been removed) are thrown out of the cabin.

W/C. Thomas is not unnaturally envious of the helicopters available to the Americans in the Middle East; but it is possible for the R.A.F. to request assistance from Wheeler Field, where an "egg-beater" is always standing by ready to be transported by air to a designated locality.

The mist which strewed the desert early on the morning of our departure dispersed as the sun began its climb and stared in through the cockpit windows. The oases at Siwa, Farafra and Dakhla were as welcome to our eyes as to those of any camel-borne nomad. So fantastic were the rock and sand formations, as we made them out in the distance, that through sun-glasses we could almost have sworn to seeing meadows, forests and ships—then a great harbour with shoals and a host of small craft. But everything was rock and sand—and more rock and sand.

The Nile at Wadi Halfa was a blessed sight, and the runway showed as a black strip in the glaring hot sand. Shell refuelled us and our crew changed into khaki drill. At Khartoum we were glad to follow their example, and W/C. E. F. Pippet, Officer Commanding, R.A.F. Khartoum, obligingly switched on his fan before telling us about his command.

Capable of housing an operational squadron, Khartoum also has staging facilities for transit aircraft (mainly Valettas of the M.E.A.F. Transport Force and Hastings of Transport Command) and provides parent facilities for the Tropical Experimental Unit. Men or equipment are despatched to Juba and Wadi Halfa as required. The desert rescue commitment is lightened by the natives, who are usually the first to spot a grounded aircraft and who promptly report it to the District Commissioner. The Khartoum-based Ansons are useful, however, for keeping a watching brief on the rescue proceedings. More usually they are engaged on landing-ground checks, in helping out the Army, or taking the station equipment officer and Mr. Griffiths, the Shell Aviation manager, round the country to check-up on petrol stocks.

The Tropical Experimental Unit is active only between March and October each year, but two or three men are always left in Khartoum to clear up and prepare for the coming season. Last year the Canberra, Meteor 8 and 11, Shackleton and Viscount were put through the killing paces of tropical trials, and an Ashton undertook special met. tests for the Royal Aircraft Establishment. This year two Venoms, a Sea Prince, a Pembroke, a metal-bladed Dragonfly, a Shackleton 2, and the Beverley are expected. The manning of the T.E.U. depends on the programme, but the staff will usually number 30 or 40 and will be augmented by the crews of the aircraft undergoing trials and by attendant boffins.

W/C. Pippet showed us round and we saw long-term storage tests in progress. These are being made with two sorts of cocooning material (smooth and rough-surfaced), and the subjects include two Tempest 2s, a Lancaster mid-upper turret, samples of Hercules 16, Derwent 1 and Merlin T.24, and an auxiliary power unit. Temperatures and humidities are taken regularly.

It emerged, as we chatted with the wing commander, that on the previous day he had flown an Anson out to test a strip in the Jebel Mageinis district. This had been scraped in the desolate, game-teeming scrub and elephant grass in order that a force-landed Valetta might be flown out; so we determined to see it for ourselves next morning before journeying on to Aden.

We had a bumpy ride, but photographer McLaren was able to record this classic feat of salvage. On one of our low passes we threw down a copy of *Flight*, and receipt was acknowledged over the R/T. Something with a gurgle in it (My Goodness, Mageinis?) rather than a 13-page description of the Sabre, might have been more acceptable; but the current *Flight* was all we had on hand, and we hope F/O. Kent and his team at least found it an agreeable change from the Valetta handbook.

The flight from Khartoum to Khormaksar (Aden) was long and often impressive—especially in the region of Asmara, perched in the mountains of Eritrea. Some hundreds of miles to the south was R.A.F. Station Eastleigh (Nairobi, Kenya), for which, as for Khartoum, H.Q. British Forces Aden, an M.E.A.F. subformation, is responsible.

We found a great wealth of Service interest in the heat-seared Aden Protectorate, extending beyond the flying units themselves; but our first concern was the squadrons.

Though controlled by the R.A.F., Khormaksar is a joint-user airfield, and one may see machines of Aden Airways, Ethiopian Airlines, B.O.A.C., Air-India, and Yemen Airlines (not forgetting Mr. Besse's Bonanza), in addition to Vampires, Valettas, Ansons, Austers, and the odd Meteor 7. The station commander is W/C. C. R. A. Forsyth, D.S.O., and he took us along to a squadron under the command of S/L. D. B. Bretherton, D.F.C., then converting from Brigands to Vampires. Though the change was a radical one, it appeared to occasion little concern, either on the score of handling or of operation. The squadron leader was confident of his unit's ability to do the job required. Certainly the Vampire pilots will have ample opportunity for armament practice: there is a range for guns and rockets at Khormaksar beach, a bombing range inland, and the unit will do its normal annual training in Nicosia. Sometimes a launch of the Marine Craft Unit is used to tow a splash target for gunnery practice, or a Naval vessel may be asked to haul a spar so that the Vampires, having intercepted the vessel, may launch their rockets at the plume of spray.

Another squadron commander who seemed happy with his equipment—though it is operated at high intensity—was S/L. J. R. Wood, D.F.C., of the Aden Communications Squadron. The aircraft are Valettas and they deliver fresh rations to the South

(Upper left) Our arrival at Salalah, with the two guards of honour wielding "pieces of ordnance ranging from sporting Lee-Enfields to ·450 Martinis." (Left) Personnel of R.A.F. Salalah, with F/O. Roy Hollingworth, the officer commanding, "on the board." (Above) The business quarter.

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Arabian route stations of Rijan, Salalah and Masirah. They also maintain passenger and freight schedules to Eastleigh, Khartoum and Fayid; supply the Somaliland Scouts (for Somaliland comes under Aden's command); and—should strips suitable for Valettas be available—they back up the Aden Protectorate Levies when these are operating up-country. Odd jobs, such as the flying of servicing parties to Kamaran Island for the assistance of Vampires staging through, or the air-lifting of troops on Mau Mau operations, turn up from time to time. On the day we called, two Valettas were plying along the South Arabian coast, one was up at Fayid on passenger schedule, one over in Nairobi, one at Khartoum, two with the Aircraft Servicing Flight, and one—the A.O.C.'s aircraft—was being prepared to leave for Somaliland. We were not surprised to hear that during 1952 the Valettas had carried 4,873 passengers and about 2¼ million pounds of payload.

Anyone who supposes that an R.A.F. flight equipped with Ansons and Austers must be a bread-and-butter affair should visit the Aden Protectorate's Support Flight, responsible for flying political officers up-country, for communication with the Aden Protectorate Levies when they are in the field, and occasionally for obliging (and thus propitiating) the Arab rulers. The Flight is commanded by F/L. Chambers, D.F.C., and one of the pilots, F/O. Mudry, gave us the most memorable afternoon of our tour when he flew us in an Anson up to the Beihan strip on the Yemen border. Beihan is a sort of little Shangri-la, with all the colour, romance, adventure and warmth of the East poured into it—or so it seemed to us. We had something to say about it in the issue of May 1st.

W/C. A. W. J. Robertson, Officer Commanding R.A.F. Regiment, reminded us not to confuse the Regiment with the Levies, for whereas the Levies are responsible for maintaining law and order through the Protectorate, the Regiment's rôle is the internal security of Aden Colony. There has been no army in Aden since the R.A.F. took over in 1947.

In command of the Aden Protectorate Levies is G/C. D. H. Wenham, M.C., and in his absence we were received by W/C. C. H. Williams. The A.P.L.s have R.A.F. Regiment and Arab officers and N.C.O.s, and are highly mobile. One flight at a time undertakes a 1,500-mile reconnaissance to gain experience of driving and living under what can be truly described as field conditions. Wear and tear on the vehicles up-country was described to us as fantastic; tyre life was somewhere between 4,000 and 6,000 miles. A three-tonner, four-wheel-drive Bedford might average 3 m.p.g. with luck. Cars are of little use and half-tracks worse. Beihan—1 to 1½ hr distant by air—is five days off by "road."

But if surface transport is tough on the vehicles and crews, it may bring indirect benefits to the Arabs, for a convoy of vehicles might be deemed by them to have "made a road," thereby helping to open up the country and stimulate trade.

Levy operations of one kind or another have been continuous for 18-20 months, and two—one against a tribe which refused to co-operate with the administration and one peace-making mission—were in progress when we were in Aden. Twice a year a recruiting column, with a Levy band, visits the sultans and sheiks. Each candidate passes through his tribal tent and the sultan is called upon to recognize him. Thus are deserters and murderers screened.

The officer ranks are of Turkish origin; the senior Arab officer of a squadron is a Yuzbashi and, of a wing, a Bimbashi.

From S/L. W. A. Plowman, Officer Commanding Aden Supplies Depot, we took a lesson in housekeeping in the grand manner. The A.S.D.—a wholly R.A.F. unit—feeds the military personnel of the colony, any visiting R.A.F. and Naval elements, the Levies, and the Governor's Guards; it supplies the Levies' camels and their fodder, runs a dairy farm with 200 head (and one thoroughbred Friesian bull), bakes 2,000 loaves a day, and restocks Rijan, Salalah and Masirah with Valetta-loads of meat, vegetables, bread and eggs three times a fortnight. Twice a year, in a ship chartered by the R.A.F., it despatches to the staging posts bulk supplies of flour, atta (for native baking), and sheep and goats "on the hoof" for ritual slaughtering by the Levies. The head baker, Mohamed Sussein Hassan, has served British forces in Aden since 1901—and he will show his paybook to prove it.

On the same premises is the Medical Equipment Depot, which supplies everything its name implies to H.Q. British Forces, visiting troops and Naval vessels, and the Somaliland scouts. It has a special cold store for drugs—reminding us that "ice harvester" is a semi-skilled trade at the Depot.

At No. 114 M.U. (next door to a Hindu temple) they have problems of their own. One of these is implicit in a prominent notice advising employees that bribery will bring dismissal. F/L. House, the chief equipment officer, told me of others—white ants, for example, and woolly bugs, which so weaken the seams of garments that there is a danger of the wearer revealing his fine brown frame too thoroughly even for Aden.

From Khormaksar the Valetta hugged the South Arabian coast and before putting down at Salalah we gazed on the forbidding terrain of the Hadramaut (The Death), and, at the water's edge, the amazing mudbrick "skyscrapers" of Mukalla.

The Officer Commanding R.A.F. Salalah, F/O. Roy Hollingworth (straight off Meteors and half-way through his six months'

(Left) G/C. G. R. Brice, C.B.E., Senior R.A.F. Officer in the Persian Gulf. (Right) The navigator of our M.E.A.F. Valetta, F/O. L. G. Clarke had just stepped down from the astrodome when a Persian Gulf hailstorm modified its contour as shown. Assessing damage are F/O. Clarke, F/O. S. A. Evans and Sgt. G. W. Heasman.

(Upper left) The tribal dance at Masirah Island is all good clean fun, and here Corporal Seymour joins in. The adjacent view shows Aden Protectorate Levies throwing a party in our honour and (above) one of them, in field service kit, is drawing a bead on an advancing "enemy." On the extreme left, with a piece of artillery from an old Portuguese fort, are F/O. J. A. Basson (commanding Levies), Mr. C. S. Wallace (station engineer), and F/O. D. Graham (officer commanding). Last, "Buck gave the Wali a circuit in the Valetta, which pleased him vastly."

tour) greeted us with a big grin and two guards of honour. They wielded pieces of ordnance ranging from sporting Lee-Enfields to .450 Martinis.

This was one occasion at least when we met the entire R.A.F. unit-strength—specifically one flight sergeant, four corporals and ten airmen. We regret that we were not able to meet the camel which is listed on the M/T. strength.

From the technical viewpoint the strip has nothing on London Airport; so we piled into a lorry to spend an hour meeting the Bedouin who had come down from the hills (bringing their own flies with them) and eyeing the Sultan's white seaside palace. A dhow lay off-shore and the C.O. told us how similar craft are used to bring in the fuel for the R.A.F. The drums are tied together, heaved overboard, marshalled by strong swimmers (at some risk to life and limb, for each drum weighs 4 cwt), and dragged up the beach. With luck, eight hundred might be brought ashore in three days. The flying officer added that his unit could make good use of a small boat for fishing and that he had his eye on something suitable; but the Arab owner was asking the impossible price of 120 Maria Theresa dollars. These beautiful old coins, incidentally, are still legal tender in those parts—as legal as a chopper applied to the wrist or a red-hot iron to the tongue.

Arabian Nights stuff, true, but for a sheer blood-and-thunder background the reader is commended to Masirah Island—barren, biscuit-coloured and green-fringed by shallows, as we saw it from the Valetta. It lies 1,100 miles from Aden, 15 miles from the coast of Oman, and, under an agreement with the Sultan of Muscat and Oman, the R.A.F. is in occupation of its north-eastern promontory. There is no cultivation and few fresh-water wells, but in the early monsoon months the beaches are alive with turtles, up to 5ft long, laying their eggs in the dunes and blotching the sand with their tears. Strange and fierce fish abound (with the C.O.—F/O. D. Graham—we watched a 7ft shark landed and later relished shark for dinner); so it is hardly surprising that swimming is strictly out—except in a disused water storage-tank.

The reputed hide-out of Captain Kidd, Masirah could tell many a tale of scullduggery. It was only four years ago that a party of Mecca-bound pilgrims was forced ashore on the mainland opposite the island by the villainous skipper of their dhow. Five died from various privations, but the others contrived to get across to Masirah and were cared for by the R.A.F. There was a whip-round and a free flight to Aden.

Less fortunate were crew-members of the *Baron Inverdale*, who put ashore for water in 1904 and were massacred to a man. The ship set course back to Aden and the Navy sent a sloop to put a few salvoes into the huts of the islanders.

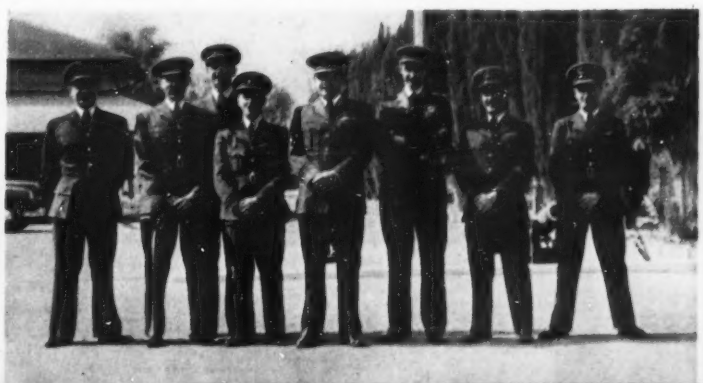
Today any such retribution would come from the R.A.F., though there is scant likelihood of its ever being called for. The Wali—who is the Sultan's representative on the island—seemed a friendly sort, with a taste for Players and a gambia (both decorative and serviceable) tucked in his sash. We sat with him to watch the tribal dancing put on for us by his people and by the Aden Levies, and before we left next morning Buck gave him a circuit in the Valetta, which pleased him vastly.

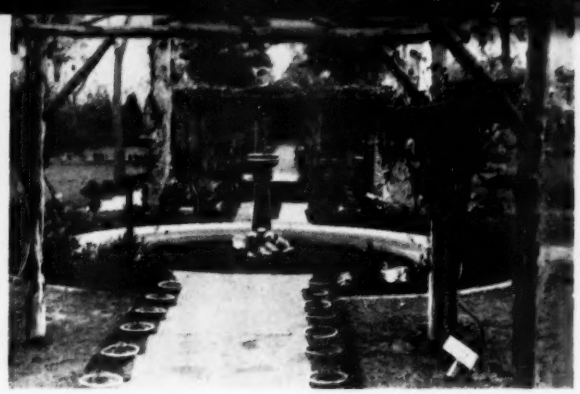
Masirah is established for 17 R.A.F. personnel and a squadron of Aden Protectorate Levies. The Levies are commanded by F/O. J. A. Basson, ex-Indian Army, and in his opinion they are almost the equal of Pathans. He ordered a mock assault for our edification—a *Beau Geste* indeed, as the picture confirms. Additionally, there are the Sultan of Muscat's coolies and a local Bedouin labour force under Mr. C. S. Wallace, the station engineer.

Train spotters have a thin time in those parts, for Mr. Wallace assured us that the little locomotive which hauls fuel from the dump is the only one between Port Sudan and Sharjah (2,000-odd miles). Air spotters have better service, and the station records show a genuine Anson Mk 1 from Muscat and a Commando of Air Djibouti.

We left Masirah with reluctance and the Valetta struck north across a wilderness of mountains rearing as high as 10,000ft. These at length gave way to a coastal plain, upon which we sighted

(Left) A.V-M. J. G. Hawtrey, C.B.E., A.O.C. Iraq. (Centre) "Best blues" at Habbaniya: (l. to r.) F/L. L. C. Packer (station adjutant); W/C. I. G. H. Drummond (commanding maintenance unit); W/C. A. N. Combe, A.F.C. (commanding admin. wing); W/C. J. Wilkin (commanding technical wing); G/C. R. A. T. Stowell, O.B.E., D.F.C. (station commander); W/C. M. W. Coombes (commanding flying wing); S/L. N. N. Ezekiel (commanding a Lancaster P.R. squadron); S/L. P. H. P. Roberts (commanding a Vampire squadron). (Right) At A.H.Q. Iraq: (l. to r.) W/C. A. D. Forster, D.F.C. (W/C. Ops.); G/C. J. O. W. Oliver, C.B., D.S.O., D.F.C. (S.A.S.O.); G/C. R. W. P. Collings, D.S.O., A.F.C. (S.O.A.).





Middle East and Far East . . .

the airfield at Sharjah, and there turned north-west for Bahrain. In the Persian Gulf we made out H.M.S. *Ceylon* and H.M.S. *Wild Goose*—the latter being one of three frigates of her class permanently stationed there—and a few minutes short of Bahrain a freak storm hit us. Of such ferocity was the hail that the astro-dome shattered, and the navigator—F/O. L. G. Clarke—who had just stepped down from the position, was lucky to lose only his hat.

G/C. G. R. Brice, C.B.E., the Station Commander at Bahrain and Senior R.A.F. Officer, Persian Gulf, gave us a personally conducted tour of the station, the gardens and swimming pool of which are considered to be the best in the whole of Bahrain—a sizeable and heavily populated island. He was kind enough, also, to have us driven out to the Marine Base, which normally handles two Sunderlands a month (staging through to or from Seletar), and we looked in on the R.A.F. Yacht Club, where members seemed well content with their *Yachting World* dinghies.

A staging post on the arterial air route to the Far East, Bahrain is of great civil and military importance. The R.A.F. and the civil operators work happily together and often lend each other a hand. For B.O.A.C. crews, and for the crews of French military aircraft in transit to Saigon, there is a standing invitation to the mess. Air Traffic had handled 214 R.A.F. and 202 foreign military aircraft in the month preceding our visit.

Much of G/C. Brice's work is of a politico/social nature, and he has an Anson in which to get around his "parish." It is often to be seen on the private airfields (of which there are several along the Gulf), owned by the big oil companies.

An occasional visitor is the Shaikh of Bahrain, His Highness Shaikh Sir Sulman Bin Hamad Alkhalifa, K.C.M.G., K.C.I.E., who was flown in a Valetta last year on a visit to the Shaikh of Kuwait. We were introduced to his nephews at G/C. Brice's residence, and on the same occasion had our first meeting with Air Marshal J. G. Hawtrey, C.B.E., Air Officer Commanding Iraq. He invited us to visit him in his "little bachelor place" at Habbaniya, and in that direction the Valetta headed next day.

To the R.A.F.'s wonderful garden city of Habbaniya, set in arid desert 50 miles west of Baghdad, on the River Euphrates, we were welcomed by G/C. R. A. T. Stowell, O.B.E., D.F.C., the Station Commander, and W/C. A. N. Combe, A. F. C., Officer Commanding the Admin. Wing. Like all newcomers to "Habb.", we were quite bewildered by the manifold activities and startling incongruities of the base itself, and by its political and military associations with the country of Iraq.

Air Headquarters, Iraq, developed at Habbaniya following the decision of the British Government in 1922, on the advice of Mr. Winston Churchill (then Colonial Secretary), to withdraw all Army units from Iraq and to entrust the protection of the newly-created Kingdom of Iraq to the Royal Air Force. It is the just claim of Air Chief Marshal Sir Arthur Sanders, K.C.B., K.B.E., Commander-in-Chief, Middle East Air Force, that the R.A.F. has lived up to the trust placed in it, first by safeguarding Northern Iraq against aggression, then by defending the southern provinces against raiding tribesmen, and finally by providing the central administration with a means of exercising effective military control while the Iraqi forces were being built up.

Today the R.A.F. is in Iraq for two reasons only—to maintain important staging posts on the Far East air route, and to help defend Iraq against attack, should need arise.

The grand tour of Habb. is an absolutely unique experience. We were immediately impressed by the thorough and orderly arrangements for passenger reception, the facilities for post-flight meals, security control, air applications, currency exchange, and the other services required of a trunk-route staging post. We saw —and admired—the various lounges, ante-rooms and dining-rooms for officers, N.C.O.s and airmen, the N.A.A.F.I. and hair-dressing saloon; we noted the pleasant orderliness of the extensive municipal area, the beauty of the Command Gardens (wherein the familiar plants of home grow wonderfully large and fast), the churches of the various denominations, and the British war-graves cemetery. And when we had beheld all these, we turned our gaze upon the farm and stables of the P.S.I., the racecourse, the kennels, the three hospitals (Levy, civil and R.A.F.), the nine-hole golf course, airmen's bungalows, shops, swimming pools, school, pitches for soccer and rugger (there are eight for soccer alone), the polo ground, and the gymnasium. In the evening we looked in on the Education Section, information room, the Printing Guild, and the Amateur Radio Club; and in due time we sought the comforts and luxuries of the Officers' Club. There we heard of the activities of the Turf Club, the Polo Club, the Riding Club, and the Amateur Theatrical Guild, and as we continued on our rounds next day we saw a pack of the far-famed Exodus Hunt setting out on the scent of desert jackals. Nor did we fail to visit the enterprising Yacht Club on Lake Habbaniya.

Our guide on the flying side was W/C. M. W. Coombes, Officer Commanding Flying Wing, and with him we looked in on air traffic control, the aircraft movements and signals sections, flight planning, and the meteorological office for Iraq Command, where we learned how local met. conditions can be equally trying at low and high levels. By raising the dust the surface winds can obscure a pilot's vision, while at great heights the Vampires may encounter jet streams of the order of 170 knots.

In the mobile wing-ops. room we met S/L. P. H. P. Roberts, officer commanding one of the Vampire 9 squadrons (a second is under the command of S/L. E. J. Roberts), and he stressed the necessity for very accurate pre-flight planning. The paucity of desert landmarks, he added, called for a high standard of low-level navigational training—but not at the expense of high-level interception practice. As for armament training, a range a few miles outside the circuit offers time-expired vehicles as an inviting alternative to the standard 10ft rocket and cannon targets.

A flying unit of a wholly different character was the P.R. squadron under the command of S/L. N. N. Ezekiel and equipped with Lancaster P.R.1s, fitted with the K.17 and the relatively new Williamson F.49 cameras. The squadron learned its job in East Africa from No. 82, an account of which was given in *Flight* of November 14th, 1952, and has been engaged on Colonial development mapping in the Aden and Somaliland Protectorates. The photographic technique entails the use of radar beacons, and S/L. Ezekiel goes out with the radar officer to find suitable high locations for the avoidance of ground screening. A Valetta transports the beacons to the nearest landing ground,

(Below) Batting-in a Mosquito staging through Mauripur to the Far East. The group (left to right) are: S/L. A. W. Barwood, D.F.C. (S/L flying); W/C. J. D. Kirwan, D.F.C., officer commanding, R.A.F. Mauripur; and—newly arrived to take over from W/C. Kirwan—W/C. R. A. Colville.

supplies the beacon party with rations and spares, and delivers jeeps and Land Rovers.

The Radar Air Liaison Section, a small unit of the Royal Engineers under Capt. R. Bowen, moves round with the squadron, checking the photographs, assessing their suitability for mapping, maintaining records of the work done, and preparing flying charts for the coverage of outstanding areas. Every three months the cameras and film magazines are calibrated, and each time a photograph is taken an automatic observer records the altitude and attitude, the time, the captain's name, G-position, and the radar blip on the navigator's screen. We gathered that the present maps of the Aden Protectorate are not exactly mirrors of the truth, some of the mountains, for instance, being considerably farther south than marked.

Further variety on the flying side was provided by the Air Headquarters Iraq Communications Flight (F/L. A. G. Corfe), which is equipped with Valettas, Ansons, a Proctor and a Devon, and maintains transport schedules through the Persian Gulf stations and to Mauripur in Pakistan. It carries staff officers throughout Iraq Command, is further responsible for operating the A.O.C.'s Devon, and undertakes first-line servicing of the Regent of Iraq's Dove.

Having made our number with the various flying units, it remained to inspect several earth-bound institutions of importance, the first being the magnificent Air Headquarters, where G/C. R. W. P. Collings, Senior Officer, Administration, and G/C. J. O. W. Oliver, C.B., D.S.O., D.F.C., the Senior Air Staff Officer, received us. Having heard of the R.A.F. co-operation with the Iraqi Air Force, we were sorry not to meet S/L. J. E. Marshall, D.F.C., the senior R.A.F. officer seconded to that Service. He holds the local rank of lieutenant-colonel and wears the appropriate uniform.

W/C. J. Wilkin, Officer Commanding, Technical Wing, told us how his Wing is responsible for the engineering, signals and armament of the squadrons, for general engineering, and for third- and fourth-line servicing of the Command M.T. A mobile servicing party from the Wing, incidentally, had been working on a Sunderland we had seen down at Bahrain. On the domestic side the Wing produces furniture and items of hospital equipment (its major medical achievement was an air-transportable iron lung), and it is further responsible for the running of the convoys over 500 miles of the Syrian Desert through Ramadi, Rutbah, along the Haifa pipeline, and by way of Mafraq to Amman.

From W/C. I. G. H. Drummond we heard how the Maintenance Unit dealt in explosives, motor transport, general supplies, baking, butchery and laundry. There was, we ascertained, a flight lieutenant post for a Command analyst, but whether or not a recent sale of obsolete stores (fetching £27,000) had been the responsibility of a Command auctioneer we never did discover.

A convoy escort exercise being imminent, most of the Royal Air Force Levies (Iraq), including the Force Commander, G/C. C. J. Keegan, D.S.O., were absent; but we did see a Machine Gun Squadron formed up to leave, and learned, incidentally, that it was the only "mixed" squadron of the Force, being composed of Assyrians and Kurds, whereas the other squadrons were wholly Assyrian, Kurdish or Arab. The Levies have much to be proud of, and they wear their white plumes with a fine air. S/L. C. N. Cobb, M.B.E., the squadron leader admin., told us how, once a year, a shooting party leaves for the Kurdish mountains, returning with the feathers of perhaps a hundred white-tailed eagles. These are dyed according to the wearer's nationality—white for Assyrians, red for Kurds, purple for Arabs.

On the opposite page are: Sgt. Ishkaq Makkho, of the R.A.F. Levies (Iraq), in Assyrian national costume; S/L. C. N. Cobb, M.B.E., inspecting a guard mounted by an Assyrian squadron of the Royal Air Force Levies (Iraq); and the Command Gardens, Habbaniya. This page (top left): the Royal Exodus Hunt setting out for exercise in the desert surrounding Habbaniya; (upper right) a Machine-gun Squadron of the Levies paraded for a desert exercise; (right) S/L. M. J. Harris, "Mayor" of the civil cantonment, introduces one of his honest burghers.

Training accords with the Levies' main rôle—the defence of Habbaniya. A flight is similar in composition to an army platoon, and a squadron is set up on company lines. The senior native officer of the whole force is a Rab Khaila; of a wing, a Rab Tremma; of a squadron, a Rab Emma; and of a flight, a Rab Khamshi.

We were astonished to learn that Habbaniya's civil cantonment has some 9,000 inhabitants (of only 13 nationalities since a Hungarian departed), and we were obliged to the "Mayor"—S/L. M. J. Harris, and to the Superintendent, Mr. Jones (an ex-divisional chief inspector, Indian Police), for a quick tour of some of its streets, shops and houses. And still (*vide* Goldsmith) our wonder grew, when back at the R.A.F. camp we were confronted by a flight of R.A.F. Mounted Police. The Officer Commanding, F/L. Blackburn, told us that their duties included patrolling of the camp, traffic control, crowd control, and security patrol outside the perimeter fence.

With S/L. J. W. H. Sewell, the garrison engineer, and S/L. R. G. Williams, the mechanical and electrical engineer, we swept through the power house, the generating station, with its five major sets, of 500 kW each and a new set of 1,000 kW; the cold

Air Marshal Sir Clifford Sanderson, K.B.E., C.B., D.F.C. C.-in-C. Far East Air Force.

At the lower left are F/O. J. Whittle (P.M.R.A.F.N.S.) and S/L. E. T. King, senior medical officer, R.A.F. Mauripur. At lower right is the officers' mess, Negombo.

(Left) The R.A.F. and R.A.A.F. at Tengah: (left to right) W/C. M. W. B. Knight, D.F.C., G/C. C. M. Champion de Crespigny, W/C. N. T. Quinn, D.F.C., R.A.A.F., and S/L. D. C. Harvey, R.A.A.F. (Centre) 500-lb bombs make an acceptable seat on a hot morning at Tengah. (Right) The R.A.A.F. Lincoln in which the writer flew on the bandit strike depicted below.

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store and ice-making plant (ten tons a day); the workshops, which make their own castings; the pattern-maker's shop; foundry; steel workship; sheet metal shop; and the bitumen yard, for asphalting, pre-cast concrete paving stones, lamp posts. . . . Not inappropriately, we came at last to the 150-bed R.A.F. General Hospital, Habbaniya, commanded by G/C. J. L. Walsh. A matron and a dozen nursing sisters of Princess Mary's R.A.F. Nursing Service do a splendid job here, and the P.M.O., W/C. A. B. Marshall, showed us the wards for officers, airmen and families, and the special ward for cas. evacs.

Before we left we called on the A.O.C. to express our thanks and amazement. He himself knows Habb. as few people do. His first tour was with 30 Squadron on D.H.9As in 1922-24; his second as A.D.C. to Sir Gilbert Clayton and Sir Francis Humphries in 1929-31; his third as Inspector of the Iraq Air Force in 1940-42; and his present command dates from September last year.

We left with the conviction that all the Vampires and Valettas, the foundry and the foxhounds, the Levies and the lamp posts would mean very little without the quickening spirit of personal service, which—nowhere more than in Iraq—imbues the R.A.F.

Jackals skulked and flittered in the shadows as we crossed from our quarters to an early breakfast, and a white-robed, rifle-armed figure took shape with alarming suddenness to challenge us. Having contrived to pass as friend, we duly boarded an east-bound trunk-route Hastings, to find that our fellow voyagers included G/C. D. A. Wilson, M.R.C.S., L.R.C.P., D.M.R.E., D.M.R., and W/C. R. A. Colville on passage to his new command at Mauripur.

A fiercesome front materialized instead of the forecast 8/8 blue, and as the Hastings ascended to 14,000ft one of the young matelot passengers collapsed like a sail. A portable oxygen set was procured but the group captain diagnosed constriction by waistcoats and sweaters, and appropriate action was initiated.

Seven hours went by before the Hastings settled on the dusty Royal Pakistan Air Force base of Mauripur, a few miles north-east of Karachi. This is the location of R.P.A.F. Headquarters (whereat the C-in-C. is A.V-M. L. W. Cannon, C.B., C.B.E.), and the station is commanded by W/C. A. Majeed Khan. The Royal Air Force is a lodger formation, and its commander at the time we write of was W/C. J. D. Kirwan, D.F.C. He showed us the staging post facilities, the sick quarters, and the aircraft servicing flight—all evidently doing a fine job. The sick quarters have 50 beds, a small pathology lab. for the diagnosis of tropical diseases, and a families and maternity section—this last for dependents of R.A.F. officers and N.C.O.s seconded to the R.P.A.F., and for the families of the A.S.T. personnel who run the transport/fighter conversion school on the airfield. The hospital also admits British civilians from Karachi.

We rose at 2 a.m. to emplane for the 1,350-mile stretch to Negombo, on the west coast of Ceylon, and that green and red gem of an island greeted us at last with cherubic clouds and a dancing sea.

As a staging post Negombo is one of the fairest of havens, and of its potential operational importance it is almost unnecessary to speak, since it overlooks the trade routes of the Indian Ocean. Commanded by W/C. F. G. L. Smith, it was the first of the stations on our route to come under the control of Far East Air Force. One of two Hastings and a single York which we saw shimmering like molten silver in the afternoon sun were, in fact, V.I.P. machines, maintained at Changi for the use of the C-in-C. Far East. Also on the island is the base of China Bay, Trincomalee—lair of the Far East Flying-Boat Wing Sunderlands when they exercise in those parts.

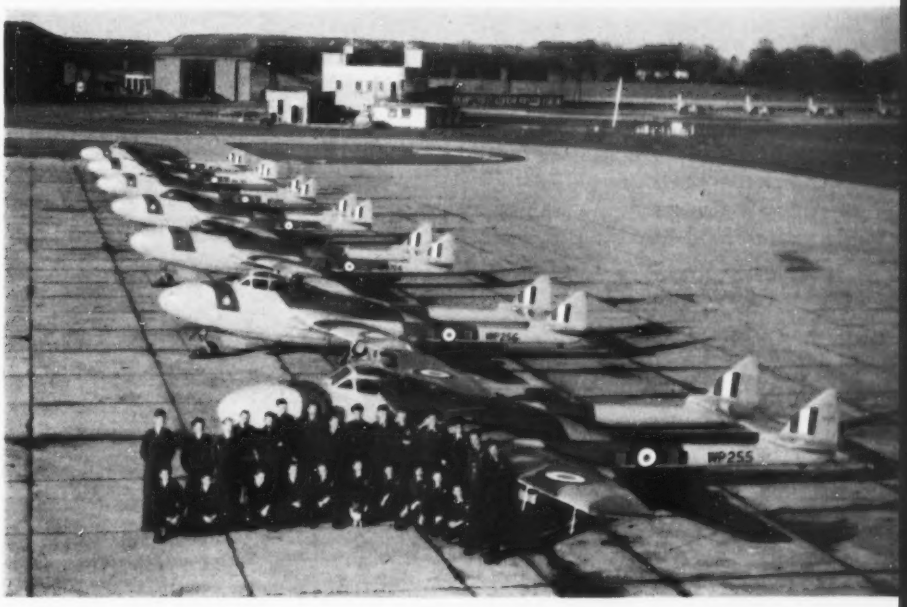
Around midnight, after too-few evening hours on the exotic lawn of the Negombo mess, we sallied out in the Hastings over the Indian Ocean on the 8 hr stretch to Changi. Our way was lit by flaring lightning and beset by monstrous bumps, and against the thundery dawn the cu-nim sprouted like loathsome fungi. None too soon the Hastings emerged from low cloud on to the wet runway at Changi, and our jaded company descended into the clammy greyness.

Our first business was at Headquarters, Far East Air Force, where the anatomy of this vast command was sketched for us. The Singapore area, which is the operational centre, has a chain of headquarters (F.E.A.F., A.H.Q. Malaya, and A.H.Q. Singapore), three major air bases (Changi, Tengah and Seletar), and a maintenance base. Far-lying to the west is the sub-formation of A.H.Q. Ceylon and to the north-east A.H.Q. Hong Kong. In north-west Malaya is the airfield of Butterworth, serving as an operational base in support of the security forces in that area, and as a staging post for aircraft crossing the Bay of Bengal; and six hundred miles out in the Bay itself, on the island of Car Nicobar,

(Story continues after colour illustrations)

(Below) Sequences in a bandit strike: a 500-lb bomb burst, photographed through the bomb bay; bombs and rockets; strafing.

THE QUEEN'S AIR FORCES



"FLIGHT" COLOUR PHOTOGRAPHS

"From Eddystone to Berwick bounds, from Lynn to Milford Bay,
That time of slumber was as bright and busy as the day . . ."

For the Great Armada read enemy bombers; for the "warning radiance" of the beacons in Macaulay's poem, the modern miracle of radar; for the little ships of Elizabeth I, the Meteor and Vampire night fighters of Elizabeth II. In service today are Vampire N.F.10s (above) and Meteor N.F.11s (below). Both types are armed with four 20 mm guns and carry a pilot and radar operator—seated side by side in the Vampire, tandem-wise in the Meteor. On the left, over North Germany, are Venom F.B.1 fighter/bombers of the 2nd Tactical Air Force. For high-altitude interception or low-level attack these single-seaters are equally effective.

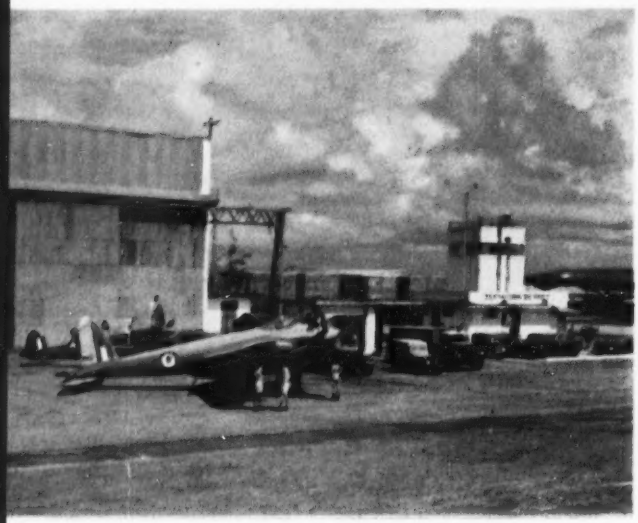
THE QUEEN'S AIR FORCES . . .

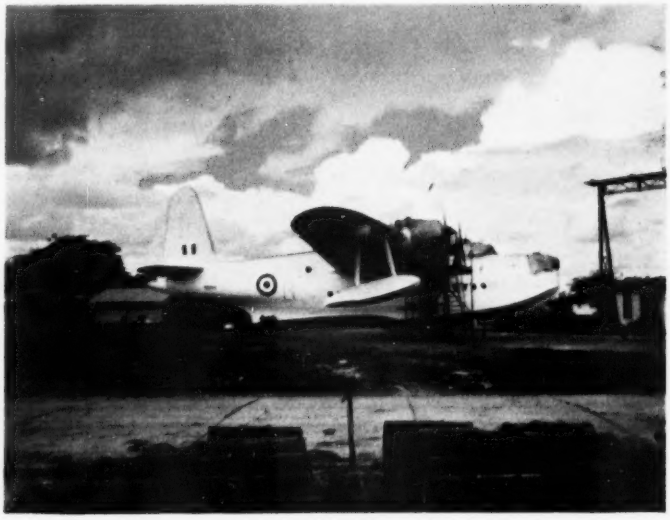
Backgrounds are varied here—the English countryside for the Meteor N.F.11s above; the stone-walled fields of Malta for the Lancaster M.R.1 (top right); the night sky for the Lincoln B.2 (right); and the blue vault of the stratosphere for the Canberra B.2 jet bomber below. The closely related Lancaster and Lincoln are nearing the ends of their days; the Canberra is literally coming into the picture. Variants of this record-breaking jet bomber serve for target marking, photographic reconnaissance and training.

Under the broad wing of a Transport Command Hastings C.2, staging through Negombo, Ceylon, to Singapore, native workers take cover from the grilling heat of the sun. Beyond, glinting against the palms, a Valetta C.2 awaits a call across the Bay of Bengal. Troops, freight, passengers—the very fabric of Commonwealth Defence—these are everyday loads for the transport machines of the Royal Air Force.

The waters of the Gulf of Aden (above) and the River Euphrates (upper right) shimmer below Vampire F.B.9 fighter/bombers of the Middle East Air Force. The grey and white Shackleton M.R.1 of Coastal Command is heading out across the harbours of Malta, G.C.

Round a flying officer of the Aden Protectorate Support Flight and the sergeant wireless operator of his Anson 19 coagulates the "local colour" of Beihan—location of one of many strips in the Protectorate.



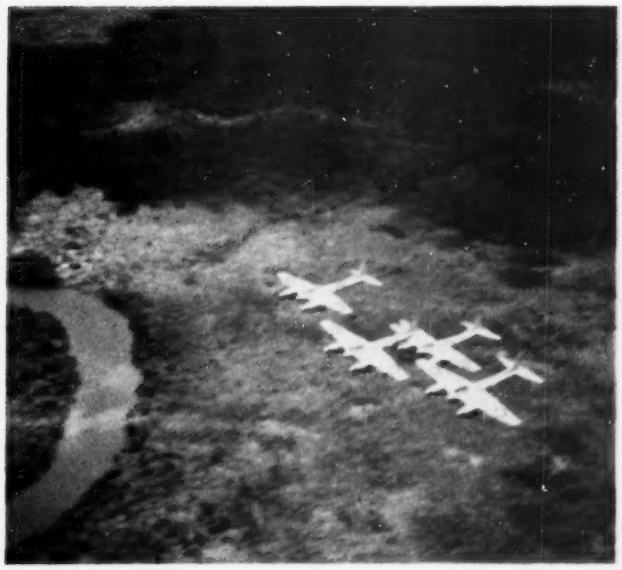


The blue Mosquito P.R.34A and Spitfire P.R.19 are being fettled for a photographic sortie from the airfield at Seletar, Singapore. At the nearby marine base a white Sunderland M.R.5 of the Far East Flying-Boat Wing (right) rides high and handsome on its beaching gear. The Sunderland is the patriarch of Service aircraft.

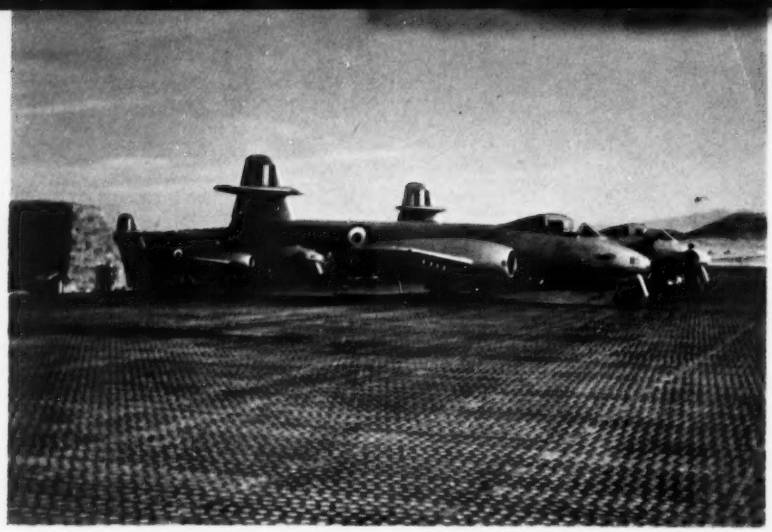
Little hampered by a brace of 500 lb bombs and four 60 lb rockets, a Hornet F.3 of the Far East Air Force is caught as it wheels away from the photographic Lincoln. The group above is the El Adem Desert Rescue Team, with their Anson, "Matador" vehicles and supply-containers. Interpreter Chico kneels.

THE QUEEN'S AIR FORCES . . .

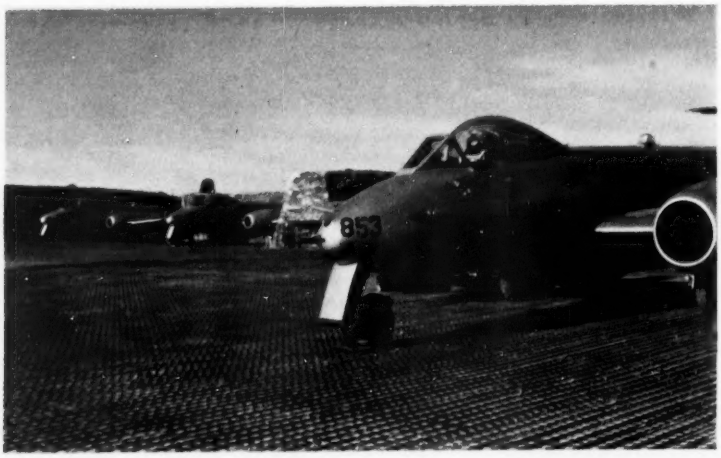
Cloud-dappled, the waters of Singapore teem with an unrivalled variety of shipping—under the surveillance of Vampire F.B.9s of the Far East Air Force. The four Hornets below have business with bandits in the matted jungle of Malaya, sprawling beneath them. Dropping zones, such as that depicted at lower right, are rarities in that country. Supplies are delivered by means of coloured parachutes, seen blossoming like huge tropical flowers near a Gurkha outpost.



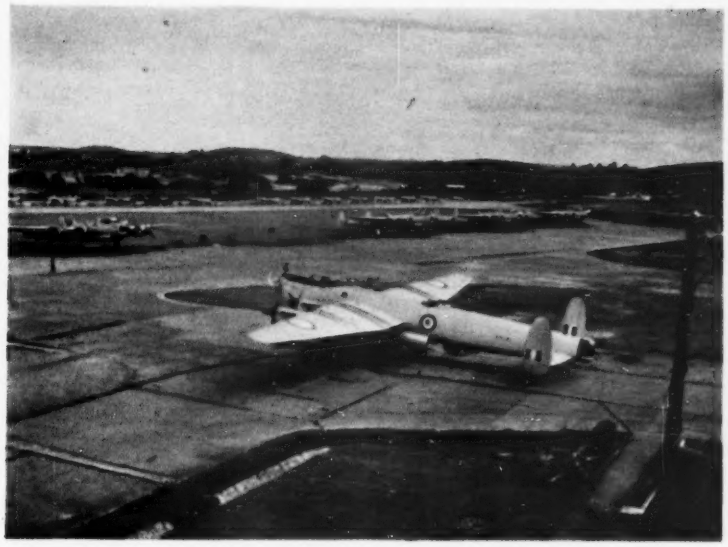
THE QUEEN'S AIR FORCES . . .

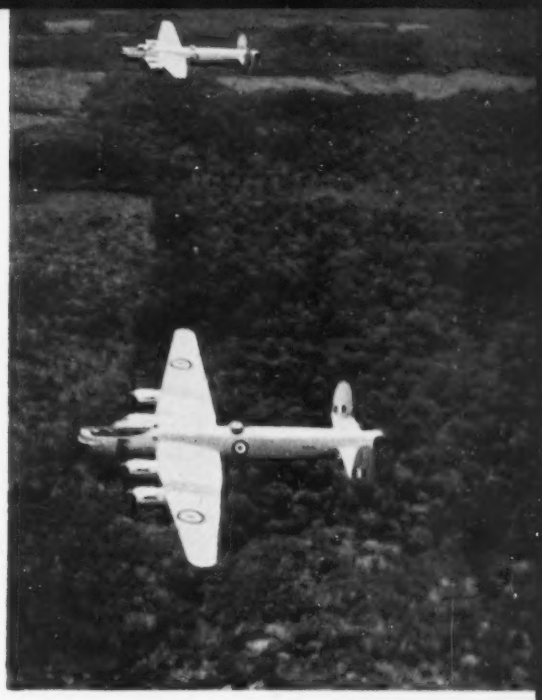


In the trim Valetta C.2 of the Middle East Transport Force, serenely cruising over Habbaniya, "Flight" representatives made their rounds of Middle East stations. Their travels later took them to Korea, where the two studies of the Meteor F.8s of No. 77 Squadron, Royal Australian Air Force (above and below) were secured. The squadron's primary function is the attack of ground targets.

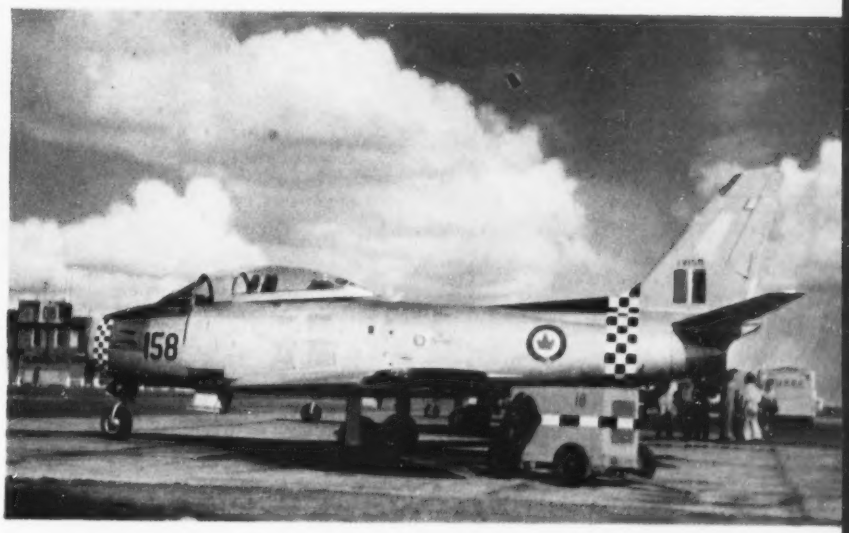


The mountains of Hong Kong (above) and of the forward areas of Korea (below) blend, respectively, with blue Spitfire P.R.19s and camouflaged Austers. The cheery pilots of the Austers are Army officers and N.C.Os.





Lincolns of the Royal Australian Air Force and (distantly ranged) Hornets of the R.A.F. stand ready at Tengah for a strike against the Malayan bandits. (Right) A pair of Lincolns pick up formation after dropping their 500 lb and 1,000 lb bombs and strafing with their guns.



Strangely contrasting in design, colour and function are the yellow Harvards of an R.A.F. Flying Training School; the supersonic Sabres of the Royal Canadian Air Force, with diced bands as their squadrons markings; the multi-purpose Dragonfly helicopters of a Royal Naval unit; and the Firebrand F.B.5 strike/fighters, ranged aboard H.M.S. "Eagle," the latest carrier in British service.

The icy waters of the North Atlantic are the setting for sleek Attackers, Firebrands and Fireflies, casting long shadows across the flight deck of H.M.S. "Eagle" at the end of a day's work. In the warmer clime of Kuala Lumpur, Malaya, an S-55 helicopter of Naval Aviation is parking down alongside a visiting Firefly.

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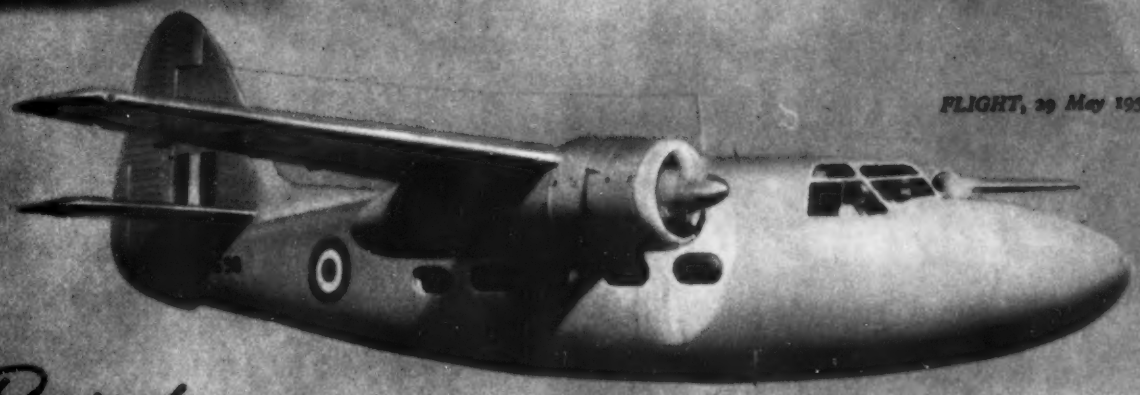

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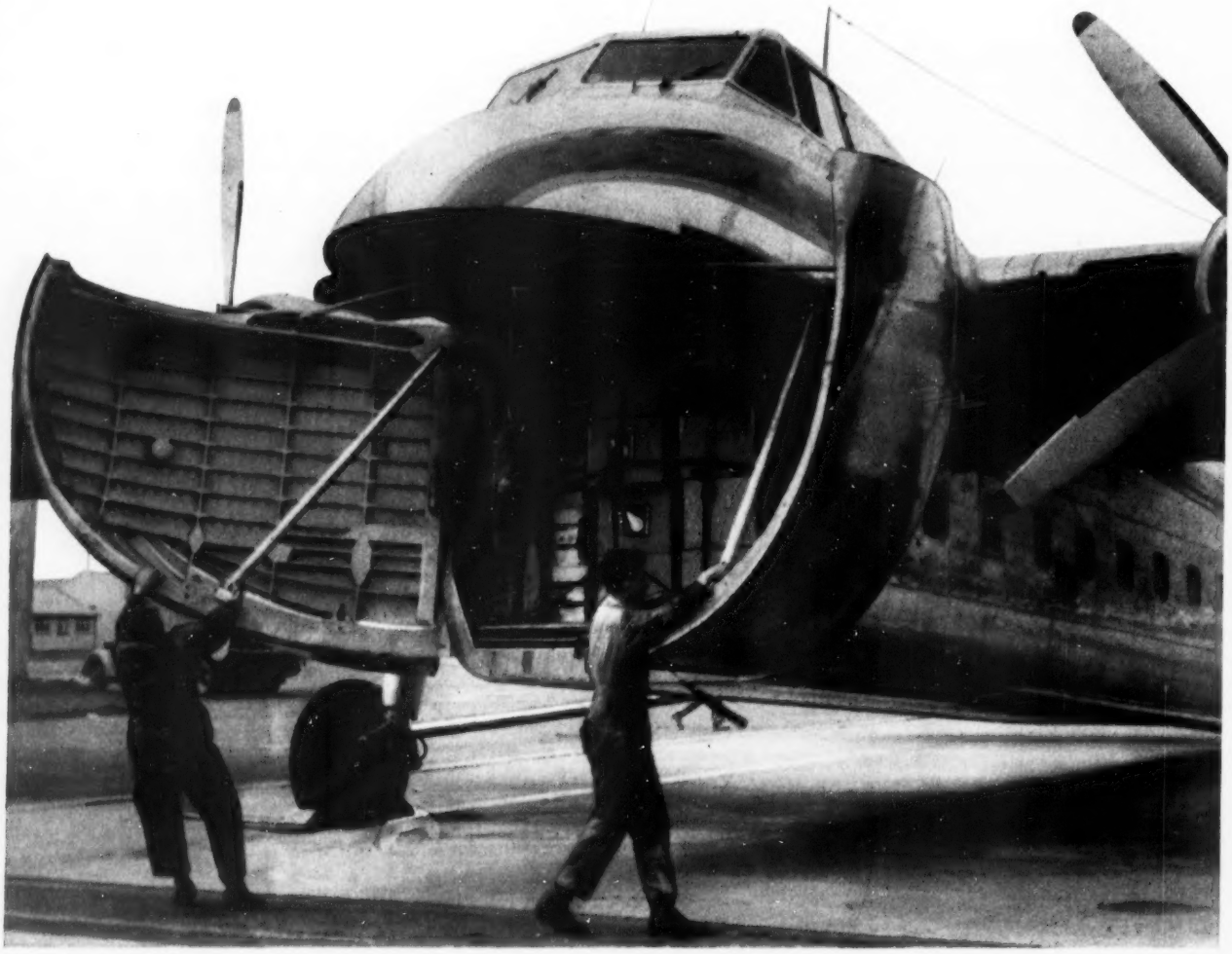

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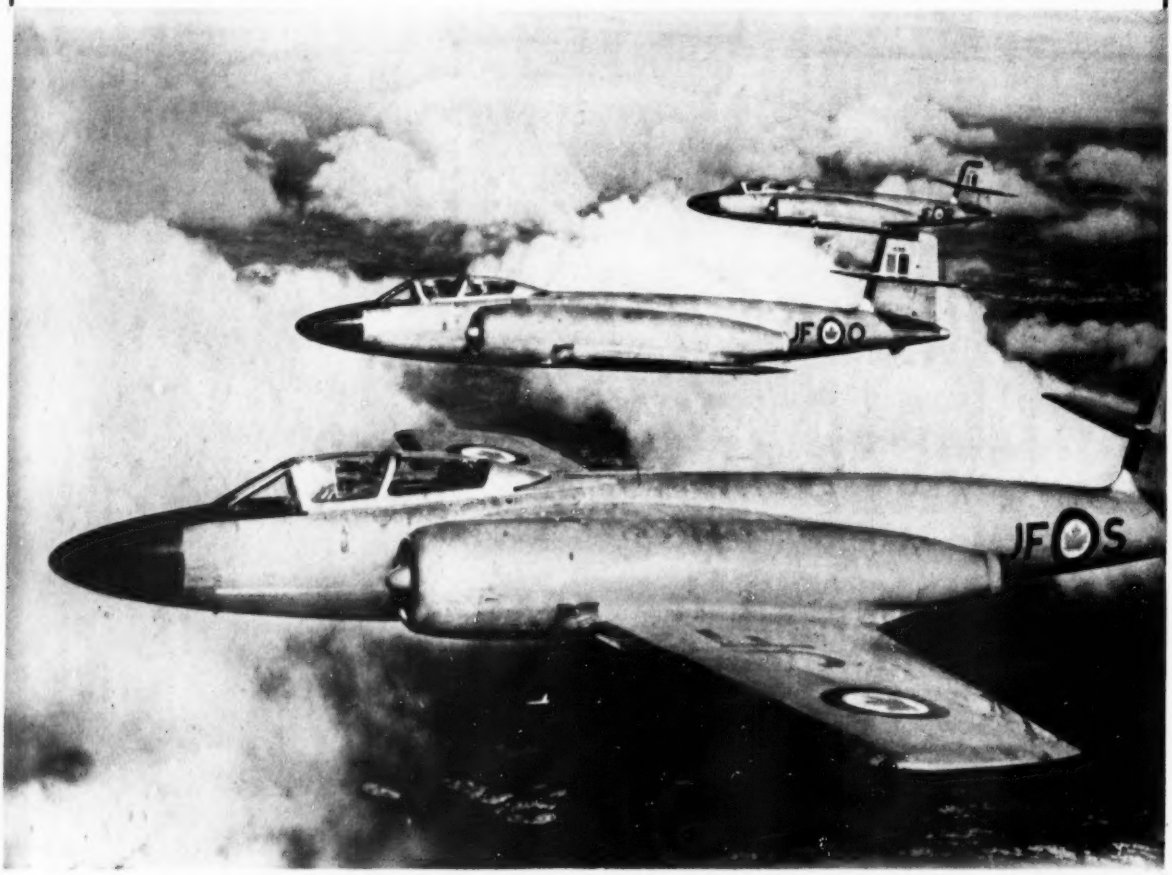

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Middle East and Far East . . .

is a signals and refuelling detachment. There is a similar detachment on the island of Labuan, off the coast of Borneo.

The A.O.C. Malaya—A.V-M. F. R. W. Scherger, R.A.A.F.—and his S.A.S.O., G/C. A. V. Bax, were kind enough to bring us up-to-date on the anti-bandit operations. The air vice-marshal impressed on us the difficulty of getting definite "identifiable and markable" targets. Precision in pin-pointing objectives and placing the bombs thereon was an immediate aim. It was imperative, he continued, not to flush the quarry from the camps before bombing started; so Hornets and Vampires were being used to pin them down while the Lincolns were making their runs, and while the troops were closing in. He went on to speak of the "immense value" of helicopters in many rôles, including one which illustrates how they can save the tax-payer's money—by salvaging expensive parachute harness after a mass drop. Low-level reconnaissance with Austers ("birds-nesting," as the A.V-M. termed it) is proving a huge success, and he expressed the greatest admiration for the pilots engaged in this arboreal pursuit. His regard for the Valetta supply-dropping crews was equally warm; they were, he assured us, doing "a hell of a job," and recovery from the almost unbelievably small dropping zones was very nearly 100 per cent. He spoke, too, of the accuracy of the Hornet's dive-bombing; of the "terrifying" effect of cannon and R.P. straffing upon the harassed bandits; and of the fine work being done by the R.A.F. Regiment (Malaya)—a squadron of which was always in the jungle on security work—and by the volunteer Jungle Rescue Teams.

An officer who gave us an insight into another operational technique was F/L. S. R. Kellaway, chief instructor to the Far East Parachute School. Basic training, he said, was along Abingdon lines, though adapted (and he said it without a trace of a smile) to local requirements. And to dispel any doubt as to the implications of the term "local," this would generally mean a jungle of trees 150-200ft tall. If caught up in these—and most of the paratroops *are* caught up—they lower themselves to the ground on 250ft webbing lines. When I met the flight lieutenant three drops had been made with the new equipment—from a Dakota into a clearing; from a Valetta into paddy and jungle; and from a Valetta into solid jungle. All were 100 per cent successful.

F/L. T. Mellard, Officer Commanding, Changi Air Movements Section, told us how his small staff manages to cope with the trunk-route Hastings, the Valettas on the Far East local routes, French military aircraft staging through, and supply-dropping Valettas. Some 2,600 passengers from the "twins" alone may be handled a month, and from the long-distance Hastings another 600-700. Apart from the frequent Transport Command and Far East Transport Wing schedules there are regular local runs, as, for instance, the daily service to Kuala Lumpur and Butterworth, the weekly ambulance service to Ipoh, the monthly ration-delivery to the British Services Mission at Rangoon, and supply drops as demanded.

From our midnight slumbers in the moonlit Changi mess we were roused by a gentle hand and a soft voice promising a bandit strike tomorrow. Morning broke tranquilly (except for a barrage of Chinese New Year firecrackers), and we set out for Tengah. We met the Station Commander, G/C. C. M. Champion de Crespigny, his Wing Commander Flying, W/C. M. W. B. Knight, D.F.C., and W/C. N. T. Quinn, D.F.C., R.A.A.F., Officer Commanding No. 1 Squadron, R.A.A.F. (Lincolns), before being conducted to the ops. room. There Major Varwell, the G.L.O., briefed us on the anti-bandit operation in which we were to participate. He related how three of some newly ambushed bandits had been killed, one had been wounded and one had escaped. The wounded man was proving co-operative in helping to pin-point the bandit camp, with its armoury and printing press; and for fear that the escapee should blow the gaff and cause his colleagues to flee, it was proposed to attack that morning. Two companies of the Cameronians were ready to close in on the encampment.

Our pilot was S/L. D. C. Harvey, R.A.A.F.; our aircraft Lincoln B.Mk 30, A73-33; and our load eighteen 500 lb bombs. There was no time to follow W/C. Knight's advice not to be modest, but to strip except for overalls, and we went aboard in khaki drill. In this undertaking the writer managed to gash his forehead; so the operation was preceded by appropriate floods of blood and sweat.

Within minutes the four Lincolns detailed for the strike had bunched at the head of the runway. They were away in short order, and at plus 7 boost and 160 kt our own machine was closing on W/C. Quinn's, with the swamplands, plantations and "ulu" streaming below. We glimpsed some Hornets drawing ahead to port, but soon lost sight of them behind curtains of rain.

An hour or so out we picked up a smoke signal of the Cameronians. It had been the wing commander's intention that the two Lincolns with 1,000 lb bombs should open the proceedings, but the cloud base was below their safety height; so his, and our own, aircraft went in first.

The detonations of the closely spaced bombs reached up and cuffed our Lincoln before it could draw away in a steep turn. The Hornets followed us in, with smoke wisping from their cannon ports, rocket trails snaking out from under their wings and bombs flashing red among the dark green of the jungle. Orbiting, we looked down into the trees which had been shattered and wrenched by the air-bursts of our bombs; and we smelt the acrid explosive. Then our Lincoln dropped low over the tree-tops for her first strafing run. Under our nose, almost, the muzzles of the forward guns swung into view, and one by one the turrets set the floor

(Top left) S/L. H. Corbett-Wilson, commanding a squadron of the R.A.F. Regiment (Malaya), tells W/C. I. O. B. Carlson, Officer Commanding, R.A.F. Regiment (Malaya), of his squadron's latest success against the bandits. (Top right) The first burst is fired on a new jungle range of the R.A.F. Regiment (Malaya). (Right) Representative of the A.O.C. Malaya at Kuala Lumpur, G/C. S. E. MacKenzie. (Below) The spot where a Malayan bandit met his end at the hands of the R.A.F Regiment (Malaya). At lower left, men of the Regiment who escorted "Flight's" representatives to the scene.

Left, our Dragonfly arrives at a Squadron H.Q. of the R.A.F. Regiment (Malaya). The pilot was F/L. Jacques (centre). Right, W/C. K. M. M. Wasse, D.F.C., the station commander at Kuala Lumpur, discusses supply-dropping with Capt. Forsyth (in cap), commanding the detachment of No. 55 Air Despatch Company, Royal Army Service Corps.

Middle East and Far East . . .

shuddering as the gunners poured "half-inch" and "20-mil" among the riven trees.

Back at Tengah we visited the Vampire squadrons, which have the defence of Singapore as their main task but which themselves make an important contribution to the anti-bandit operations. Their weapons are cannon, rockets and bombs, and a grenade depicted on the tail of one machine merely served to identify its pilot as S/L. Mills. These Far East Vampires, incidentally, wear their squadron badges and other insignia on the tail rather than the nose of the nacelle, because in the latter location they are too quickly erased by tropical storms. The badges are rendered more durable by a coat of Max Factor clear nail varnish.

One of the pilots showed me his jungle kit, which is worn beneath the Mae West. It contains spare socks, gloves, mosquito net, heliograph, pyrotechnics, energy tablets, morphine and first-aid equipment, water-bottle, and tins of emergency rations.

At a minor celebration in the Changi mess one Sunday evening we met W/C. I. O. B. Carlson, Officer Commanding, R.A.F. Regiment (Malaya). He attributed the prevailing high spirits to the Regiment's latest bandit kill; and with him, on the following morning, we boarded a Valetta for Kuala Lumpur and the terrorist country. At the delectable "K.L." we transferred to a Dragonfly helicopter, which whisked us up towards the H.Q. of the Regiment squadron concerned. The wing commander was frankly puzzled, for though he was familiar with our destination, he could not imagine how a helicopter could be set down there. In the event we settled with no bother at all on the 25-yd range—only to learn that one of the big S-55s had already called in and departed.

Among the officers introduced to us by S/L. H. Corbett-Wilson, the O.C., was P/O. Salleh bin Hassan, one of the first three Malay officers to be commissioned in the Regiment. He told us he had been through courses at Spittlegate, Catterick and Watchet, and it was his section which had just scored against the terrorists. A bandit patrol had been ambushed as it entered a rubber plantation in extended line : one terrorist had been killed by a Bren bullet, which exploded a smoke grenade and small arms ammunition slung at his waist, and a second had dropped his pack in making his escape after being wounded. We examined the dead man's kit and saw that it contained a tin of opium, hair clippers and documents. (We are still not clear what became of the roast pork and duck—presumably left-overs from the New Year celebrations —which were also found on his person.)

The scene of the action being only about five miles off, W/C. Carlson ordered Stens all round and we piled into a Vanguard with F/O. Chapman and zoomed away. A Daimler scout car and a thirty-hundredweight followed, carrying our escort with their Stens, Brens and jungle-pattern rifles.

In the dripping rubber plantation we were guided to a certain tree by furrows ripped in the earth by Bren-fire. The trunk had been scored by bullets and the earth at its base was stained a darkening red. Spent .303 cases were strewn about under the leaves. Our escort ringed the spot, facing outwards with arms at the ready, and as we surveyed the scene we could not help reflecting how Lady Luck had sponsored our request that we might see "the work of the R.A.F."

We have already given the A.O.C.'s opinion of the supply-drop crews, and one morning we went along in a Valetta to form our own. It was the task of Sgt. Kerr, as captain, to deliver to "D.Z. Mike"—set very awkwardly in a bowl of jungle-covered hills—3,226 lb of supplies. They were made up in massive packs and stowed forward of the spar, and the nature of the contents we never discovered. But several nationalities, religious denominations and even species must be catered for in the dropping business, including Africans, Ghurkas, Malays, Fijians, Borneo trackers, police, the Civil Liaison Corps—and war dogs. And every man in the jungle gets his cigarettes, rum, water-sterilizing outfit, bug-bombs, salt tablets, insect repellant, tins of drinking water, foot powder, candles and rifle oil.

Low stratus can militate with the shaggy, hilly terrain to render the drops as tedious as they are hazardous, and on the day before our trip F/L. Smith had spent five hours in putting down ten packs because of stratus over the dropping zone. Everything is man handled and our Valetta carried four despatchers. They worked like dray horses, though with the sense of timing and balance of circus ponies; and they swore like gentlemen. One of our colour pictures testifies to their accuracy. Again and again the Valetta ran up to the D.Z. (for only one pack could be put down at a time) at 110-115 kt, with 20 deg flap. The horn blared and the signal buzzer warned the navigator, who was supervising at the doorway and screeching "Now!" at each crucial moment. The writer did his best to keep out of the way and not to screech too loudly himself whenever the Valetta scraped over a ridge or nuzzled a hillside. As the A.O.C. said—a hell of a job.

The Helicopter Wing based at Kuala Lumpur is commanded by W/C. W. R. Williams, D.F.C., and is unique in composition and function, being made up of a Naval squadron of S-55s (Lt.Cdr. S. H. Suthers, D.S.C.) and an R.A.F. squadron of S-51s (S/L. G. R. G. Henderson). Its operations are principally casualty evacuation, reconnaissance and transport, and during our visit various new techniques for the employment of the S-55s were being investigated. Supply dropping; the "winching" of troops, stores and casualties; the emergency deployment of troops to cut off the retreat of bandits; assaults on enemy strongholds; mortar carrying and mortar spotting; photography; search and rescue; leaflet dropping; the guidance of troops in "blind" country; the lifting-out of captives or documents—these are but a few of the manifold possibilities. The bandits may soon be made aware of others. For the investigation of flying accidents, incidentally, the helicopter holds great promise, and I heard how the wing of a crashed Brigand had been winched out of the jungle for inspection.

New pilots for the Wing are flown in Austers to familiarize themselves with the country. Simple operations, under the surveillance of experienced pilots, follow, and a new man must diligently improve his knowledge of the jungle, the cultivated areas, police work, flying conditions and escape procedure.

We managed to intercept F/L. R. T. A. Church, regular adjutant

(Below) Literature, sauce, potatoes, Brylcreem and pineapples for the troops. Right, the prospect through the door of a supply-dropping Valetta.

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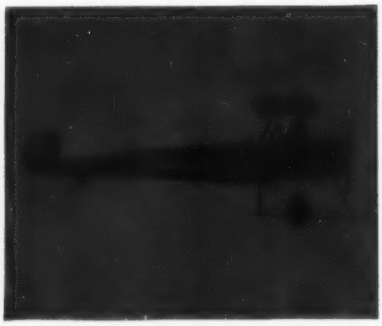
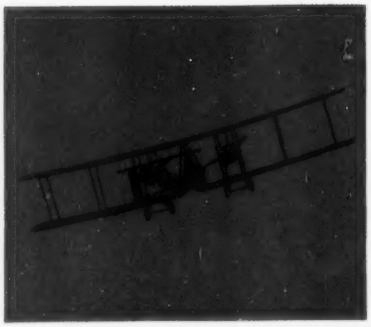

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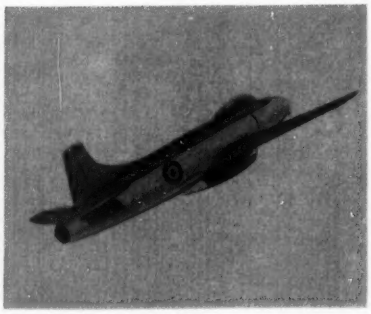

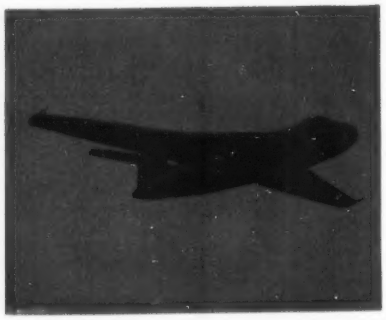

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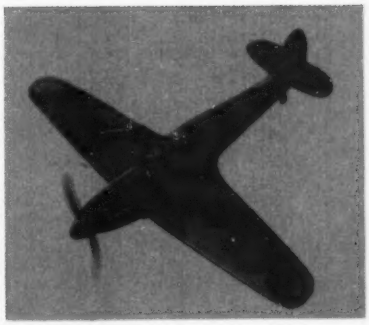

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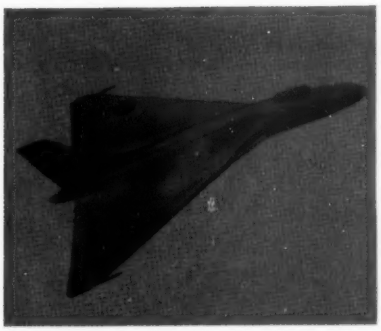

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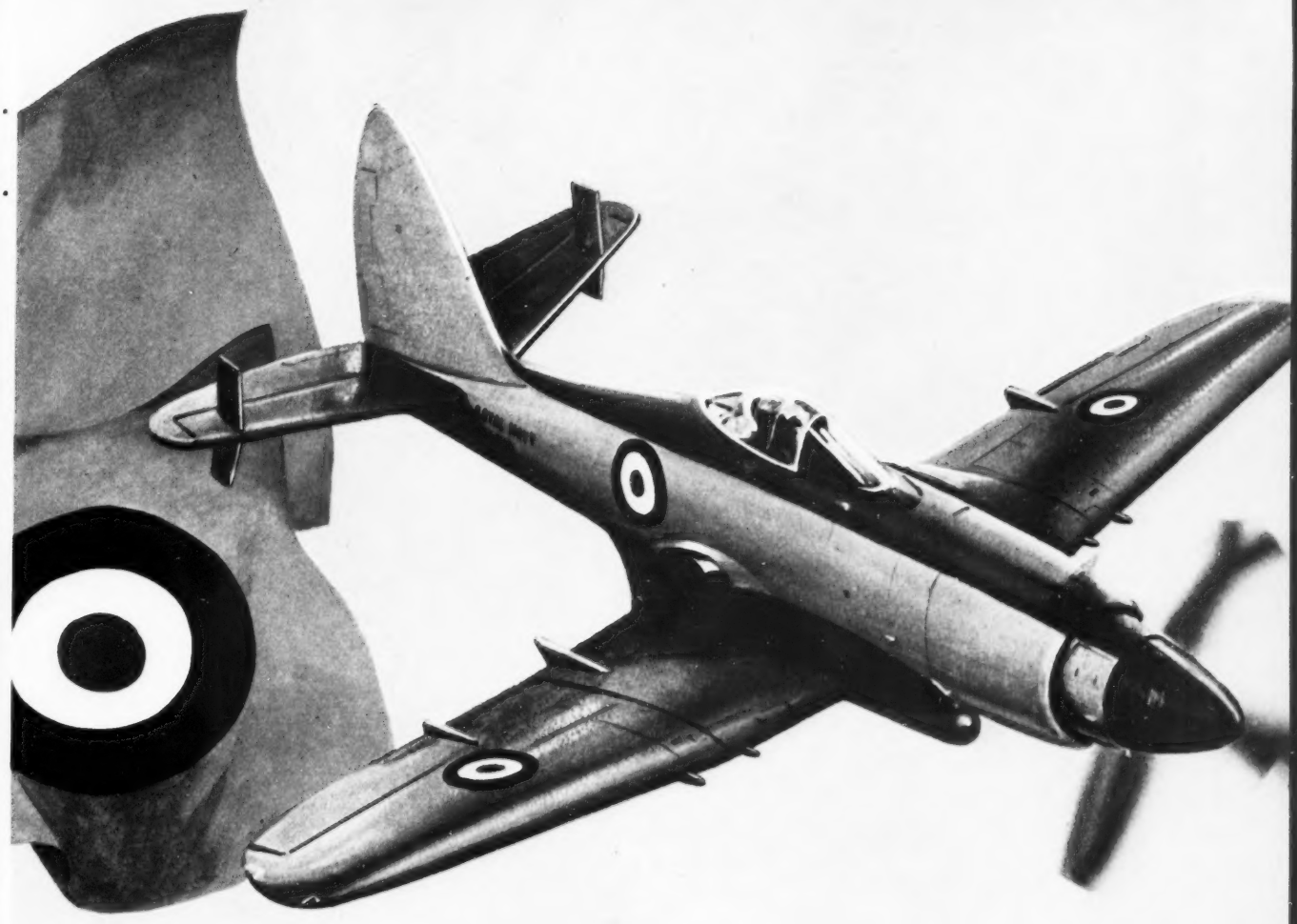

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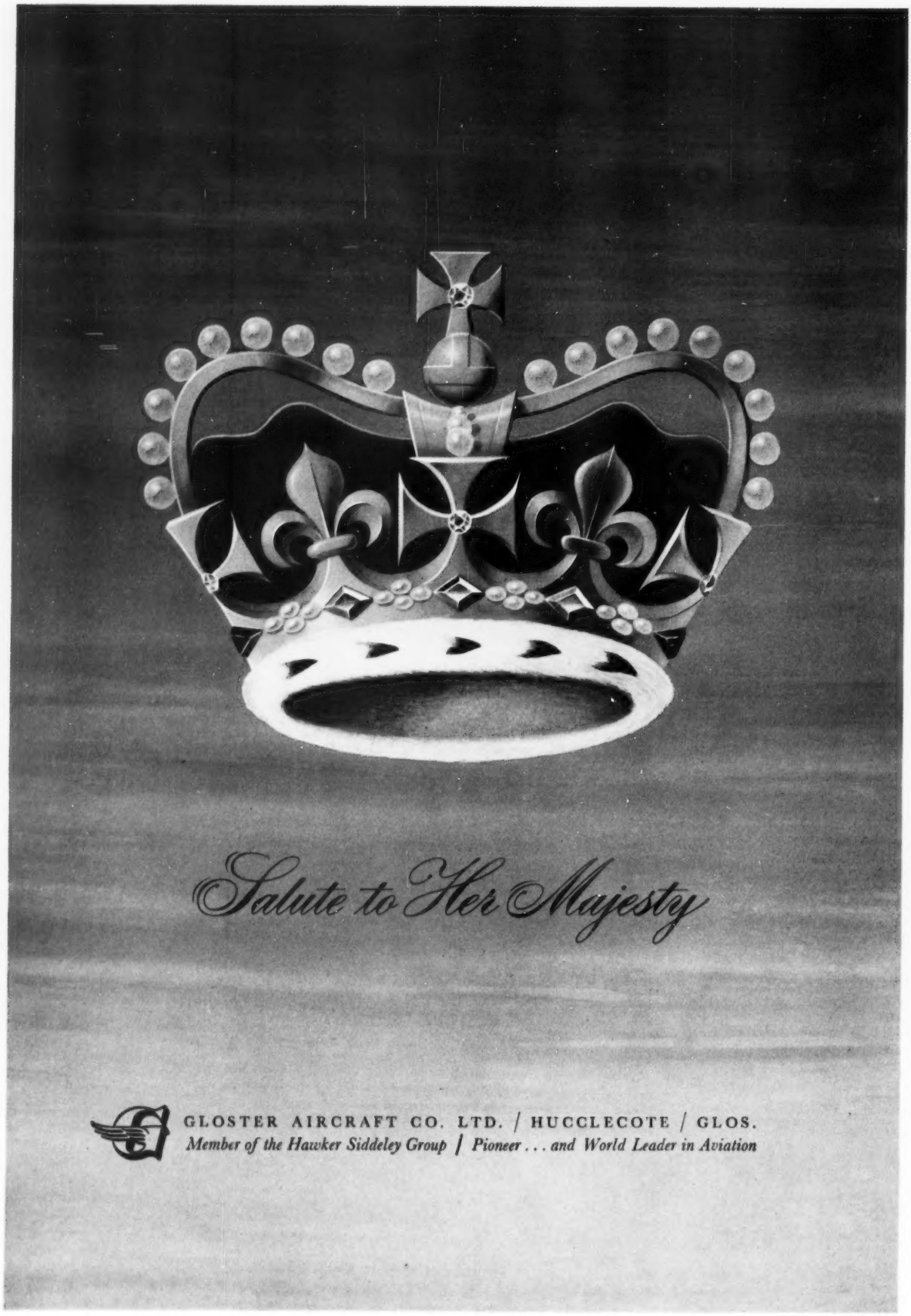
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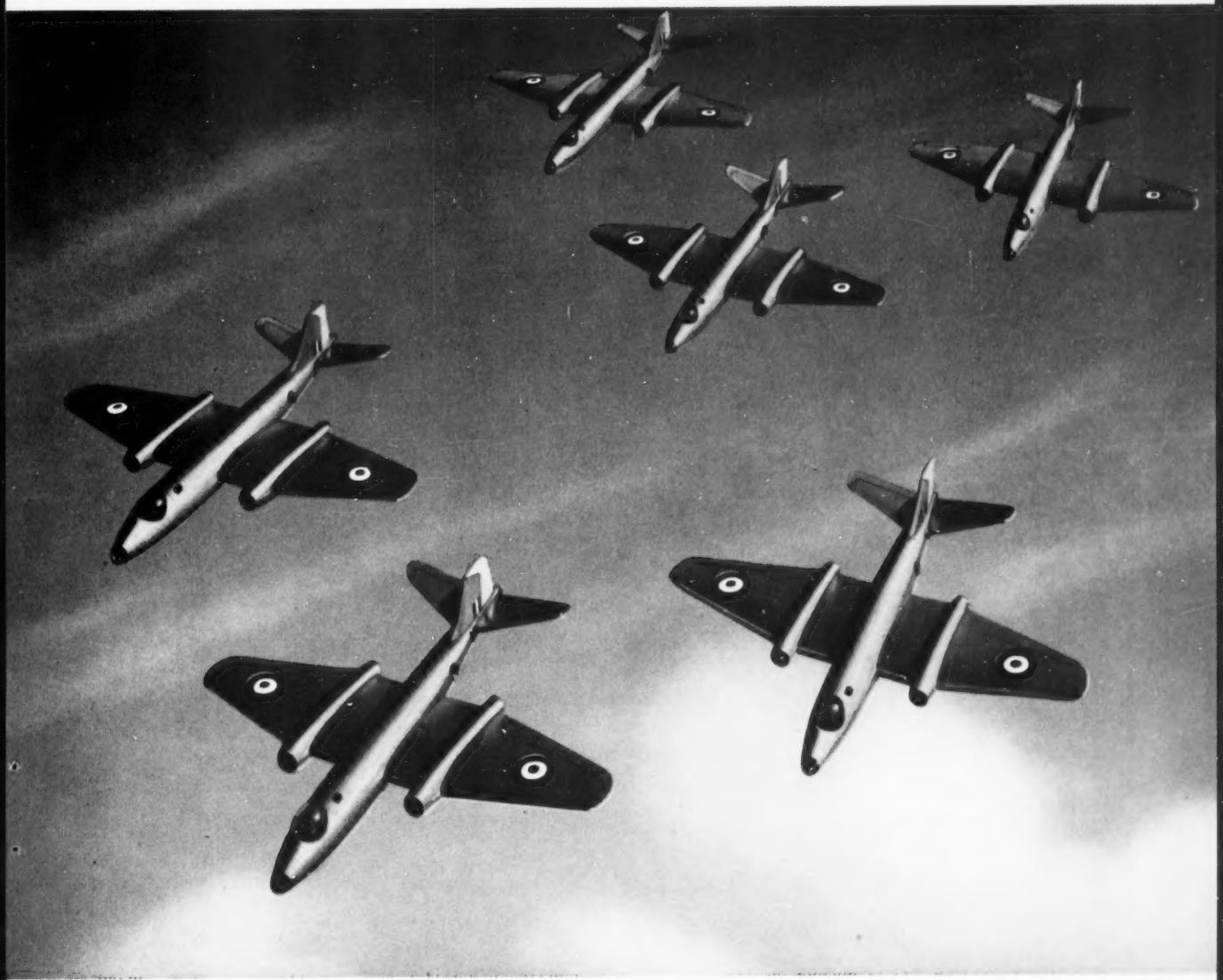

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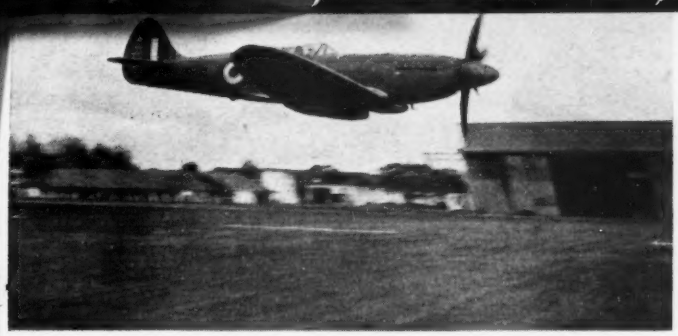


We asked S/L. Swaby, commanding a Seletar-based P.R. squadron, to request a Spitfire P.R.19 (F/O. Giddens) and a Mosquito P.R.34A (F/Sgt. Anderson) to present themselves for "Flight's" camera. These are the results.

Middle East and Far East . . .

of the Kuala Lumpur (F) Squadron, Malayan Auxiliary Air Force, before he took off in one of the squadron's Harvards. The pilots, he told us, are British subjects—Europeans, Malays, Chinese and Indians, but mostly Europeans. When the squadron eventually becomes operational Asians will predominate. At Kuala Lumpur also is a unit of the Malayan Air Training Corps.

A gracious and restful interlude in a bustling day was lunch at Air House with G/C. S. E. MacKenzie, the A.O.C.'s representative with the G.O.C.; and what the group captain does not know about the bandit war must be of small consequence. He reiterated what the A.O.C. had told us—that the R.A.F. were pressing to be employed against pin-point targets and not, as he put it, "as a line of beaters." Photographic reconnaissance he described as "the basis of everything"; and he assured us that the dropping zone we had seen from the Valetta (about the size of a football pitch) was a "terrific" one. Most of them were invisible. Two sidelights on the operations appealed to us : one, that the Ghurka's name for a supply-drop Valetta is "The Quartermaster"; the other that a recognized technique for lowering hung-up supply packs from the trees is to shoot them down with a Bren gun.

After lunch the group captain drove us over to H.Q. Malaya, and in the Advanced A.H.Q. Ops. Room we saw how the Duty G.2 (Air), Duty S/L. Ops. and Duty Intelligence Officer sit together, in direct contact with the Army and with the R.A.F. Major Gwilliam and S/L. Hancock found time to ascertain the results of our Lincoln strike some days before. It appeared that the captured Communist terrorist had been unable to identify the site of his H.Q. correctly and our bombs had struck 500-1,000 yd wide. They had, however, caused the C.T.s to split up, after which they had twice been bombed again. As a result of the operations five had been killed and five surrendered.

We heard more about the bandit business from Major L. J. Wheeler, D.F.C., R.A., whom we met, with Capt. Short, the I.O., at the base of an Auster squadron. This unit is surely one of the hardest worked, and hardest working, in the Service, having flown well over 50,000 sorties since the beginning of the Malayan emergency in 1948. There are four detached flights and one of these alone has logged over 10,000 hr. The tasks are reconnaissance of bandit-cultivated areas in the remoter parts; close reconnaissance with the infantry (the A.O.C.'s reference to "birds-nesting" will be remembered); supply dropping; casualty evacuation; helicopter escort; target marking with smoke generators; and liaison and communication flying. Ranging over most parts of Malaya day after day, the Austers are constantly in radio contact with a ground station. Each of the detached flights supports a particular brigade, and some important operations have been mounted on the strength of information provided by their pilots. In the Straits of Malacca the Austers have "done a shoot" with a frigate.

Self-help is the order of the day. The Sellers/Bankes aerial, described to us as "a re-hash of a ham design," is the handiwork of the squadron ("Bankes" is an R.C. padre with one of the Flights), and Cpl. Rickards has evolved a useful quick-release device for supply-dropping.

On our return to Changi we saw and heard a Valetta testing a loud-hailer, demanding of the citizens of Singapore "Who killed Cock Robin" and laying "Six to four the field." Also in evidence was Bristol's Freighter demonstrator, wearing R.A.F. markings. It had flown out from U.K. with a Sycamore inside it, and A.V-M. H. L. Patch, C.B.E, the A.O.A., who dropped in to see us at the mess, told us that the opportunity was being taken to try it out on the Car Nicobar and Hong Kong runs.

The Singapore area still had much to interest us, and a "must" was the Seletar-based P.R. squadron, commanded by S/L. W. P. Swaby and equipped with Mosquito P.R.34As and Spitfire P.R.19s. Having completed a high-level survey of Malaya (1 in 25,000) the squadron had more recently been engaged in "Firedog" coverage (i.e., for the "emergency") at 1 in 10,000.

Numerous sorties are rendered abortive by cloud. It seems that low cloud in the low-lying areas of Malaya quickly rises up the hillsides under the heat of the sun : a Mosquito might be airborne at 7.30 and two hours later the sun, as S/L. Swaby put it, would have "done its dirty work." Other dirty-workers are the white ants, which are particularly partial to a gamey Mosquito. Fortunately, they have an aversion to dope, so skin abrasions are quickly covered. A watchful eye must also be kept for glue deterioration.

A neighbour-unit of the P.R. squadron is the Far East Training Squadron (S/L. R. F. Hitchcock). Its stock-in-trade includes Hornet F.3s, Mosquito T.3s, Meteor T.7s, and Vampire F.R.9s, and its tasks are the operational conversion of Mosquito pilots to Hornets; examining for instrument ratings in all the Far East fighter squadrons; and providing refresher courses for Vampire pilots.

Beaufighter T.T.10s of the Station Flight at Seletar (F/L. H. Y. B. Yates, D.F.M.) tow targets for the Far East Fleet, the Indian Navy, shore batteries and the Malaya-based fighter squadrons. A Valetta of the same unit does radar calibration for the entire Far East, and a Hornet 3, with F/L. Griffiths and Sgt. Taylor as the pilots, climbs every morning to 30,000ft on met. reconnaissance. The Flight also tests for the nearby M.U.

It will already have been gathered from the foregoing that Seletar is a base of more than average interest; and when we add that it also houses the Far East Flying-Boat Wing (W/C. D. MacKenzie, D.F.C.) its full importance will be appreciated. The work of the Wing, and an account of the journey to Iwakuni, Japan, in one of its Sunderland M.R.5s, will be given in a future article—wherein the activities of the R.A.F. and R.A.A.F. in Japan and Korea will also be described.

On the arduous journey up to "the sharp end" our only stop was Hong Kong, and though time did not allow us to visit the squadrons there (at Kai Tak and Sek Kong), we got together over tea and toast with S/L. H. J. Houghton, D.F.C., the S.I.O., and noted down the following.

Reputedly the most hazardous airfield used by the R.A.F., mountain-locked Kai Tak houses a Hornet squadron, a Station Flight, with target-towing Beaufighters, a P.R. detachment of Spitfire 19s from Seletar, and the Hong Kong Auxiliary Air Force. When the occasion arises the Hornets lend a hand with photography, but their primary rôles (and those of the Sek Kong Vampires also) are the air defence of the Colony and the close support of the Army. As A.O.C., A. Cdre. R. C. Field is responsible to the Commander, British Forces.

Hong Kong, S/L. Houghton reminded us, lies within the typhoon belt and when deemed prudent the Sek Kong Vampires are flown over to Kai Tak for hangarage, crossing 3,000ft mountains en route. Any Sunderlands which may be in—and at least one is permanently attached to Kai Tak for air/sea rescue—cross 500 miles of ocean to take refuge at Sengli Point, in the Philippines.

From Hong Kong we pressed on northwards to Japan and Korea, and our work there being accomplished, headed homewards *via* the Cocos Islands, Mauritius, Entebbe, Idris and Manby, in a Flying College Hastings. The trip was described in *Flight* of March 27th.

Having been parboiled and chilled, fêted and frightened for 5½ weeks, only when the winter chills of England seized our bones did we really begin to form a considered view of all we had seen. It was this : that Her Majesty's Air Forces overseas are custodians not only of the Commonwealth but of the true Elizabethan spirit —chivalrous, adventurous, resourceful, loyal.

Having dropped a smoke generator, of the type used on anti-bandit operations, a Malaya-based Auster A.O.P.6 (left) descends for a look-see.

This Armstrong Whitworth (Gloster) Meteor N.F.11 carries the black and red chequerboard of No. 85 Squadron. The navigator sits in the back seat and faces forward towards his radar equipment.

"Flight" photographs

THE QUEEN'S AIR FORCES...

FIGHTER COMMAND AND 2nd T.A.F.

IT is with the Battle of Britain that Fighter Command will for ever be associated. Then it was that the British public first began to know something of the Command's work, and there are few indeed who do not recall those white vapour trails against the blue September skies of thirteen years ago.

But the Royal Air Force, and Fighter Command in particular, cannot afford to live in the past or rest on great achievements now part of history. Each day, the security of our homeland depends in the first place upon this Command and upon the strength which it can bring to bear at the right place at the right time—irrespective of weather, maintenance schedules and all the thousand-and-one things that threaten the efficiency of an air force.

Like all such organizations, Fighter Command has undergone fundamental changes since 1940, and the pilot who flew a Hurricane or Spitfire in that year would feel like a fish out of water with a squadron of today—although, of course, many such pilots have remained in the Service, as is obvious from a perusal of the earlier pages of the *Air Force List*. But before present squadron life is discussed, attention should be turned to the aircraft which equip the Command, or are about to be introduced.

The first name one thinks of is, of course, the Gloster Meteor. Through Marks 1, 3, 4 and 8 it has been the backbone of the Command for many years and is still by far the most numerous aircraft type in the Royal Air Force. Its strength and dependability have become a legend and, although there is a growing tendency to poke fun at straight-wing fighters, the Royal Air Force owes the Meteor a great debt. Not only has it provided a pillar upon which our air defence has leaned heavily for very nearly ten years (Meteors were in action against flying bombs in 1944) but it has been the means whereby many hundreds of pilots have become thoroughly experienced in modern air fighting. For years to come the majority of our fighter pilots will be able to show many pages of Meteor time, logged at their A.F.S., O.C.U. and front-line squadron. For ordinary interception of medium-speed aircraft, or for ground-attack or photo-reconnaissance or all-weather fighting, the Meteor is still hard to beat and it will be seen for a long while yet.

The de Havilland Vampire followed hard on the Meteor's heels as the second British jet fighter. Quite large numbers were at one time on Fighter Command's strength, but this is no longer the case. Today the Vampire is found only in the 2nd T.A.F. in Germany, in Middle and Far East Air Forces—and, of course, in almost any other country one cares to mention. In Great Britain, single-seat Vampires are reserved for the R.Aux.A.F., where their economy, superb handling and versatility are responsible for the affection in which they are held.

But it should not be inferred that Fighter Command no longer favours D.H. twin-boom fighters, for our day-fighter strength is being reinforced continually by deliveries of Venom F.B.1s. For every aspect of performance except sheer speed these neat aircraft can put up a good show against any comer, swept-wing or not. Much more powerful than the Vampire, the Venom is considerably heavier and it cannot avoid making slightly greater demands in the matter of runway length and strength, although these factors are still unusually good by any standards. Most of the first batches are going to Germany, but the Venom will probably soon be a very familiar sight in English skies. As yet no de Havilland successor to the Venom has been ordered but it may be remembered that the D.H. 110 is one of our supersonic prototypes.

A "wet start" on a de Havilland Vampire N.F.10 of No. 23 Squadron sends a searing yellow flame into the darkness. In these aircraft the radar operator/navigator sits to the right of, and slightly behind, the pilot.

Transonic research aircraft are one thing, but transonic fighters are quite another. To North American Aviation at Los Angeles must go the credit for producing the first aircraft in the latter category, and the Air Council undoubtedly did a wise thing when it was decided to bring the Sabre into large-scale service with the R.A.F. True, it is a very complex and expensive aircraft, and it will mean that a whole range of American spare parts, from nuts to complete airframe sections, has to be stocked throughout the Service. This is, in the opinion of many people, a bad thing, and something that should not have been necessary; but anyone who has been in close touch with Fighter Command realizes that the Canadair-built Sabres are very welcome; "we're darned glad to have them" is the usual feeling.

Nearly 400 Sabres are coming, about half with the General Electric J47 turbojet and the remainder—this autumn—with the Orenda. Most of the initial groups have gone to Germany, but Fighter Command is now receiving a big supply, all flown from Montreal by R.A.F. Ferry pilots. The first units are not yet formed, but this is just a matter of weeks.

Only just behind the Sabre is our own Supermarine Swift—and we are speaking in the chronological sense only. Both Swift and Hunter have undergone great changes in the past two years—changes that have carried them easily and smoothly through the Mach number of unity and have made them the most effective fighters in the world. Their speed, manœuvrability and beauty are well known; it is a great comfort to know also of the excellence of what lies under their smooth skins and to recall their unmatched development potential, which will assuredly be put to good use.

When they enter service—the Swift in a few weeks, the Hunter later this year—they will give the Command tools which no other Air Force can match.

Turning to the all-weather side of the Command, it appears that the omnipotent Mosquito has at last departed after a valiant decade of both defence and offence. In its place have come large numbers of Vampire N.F.10s and Gloster/Armstrong Whitworth Meteor N.F.11s, and a squadron of each type opens our colour section on page 659. These fine aircraft are proving invaluable in filling a vital gap and in preparing for the mighty Javelin, still some way off, but discussed by every all-weather squadron. Until the big delta-wing fighter comes, our defence is surely placed in the many Vampire and Meteor "N.F." units—and, soon, in those squadrons which will shortly convert to the N.F.2 and 3 versions of the Venom.

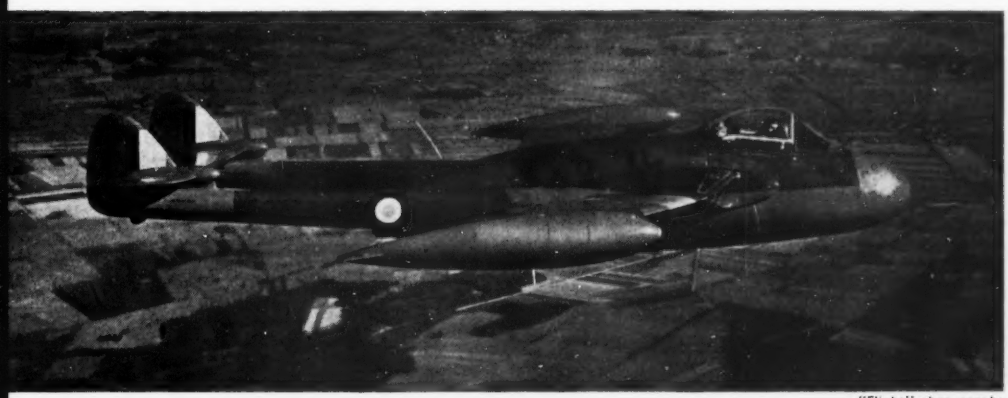
So much for the aircraft. A brief note on "org. and admin." will not be out of place at this point. Fighter Command is, like any other command, directly under the control of the Air Ministry. All units of the Command are permanently based in the United Kingdom; if, in emergency, a permanent fighter squadron is sent abroad it becomes a part of the overseas Air Force to which it is attached. A squadron sent to Germany, for example, joins the 2nd T.A.F. (Tactical Air Force) which is an entirely British formation responsible for the defence of the British Zone, and for the general maintenance of tactical air superiority over central Europe.

The 2nd T.A.F. is in no sense subservient to Fighter Command. The various links are of a lateral nature, to provide the closest co-ordination of effort with other R.A.F. units. On the other hand, 2nd T.A.F. does form a part of 2nd A.T.A.F., with headquarters at Fontainebleau. The Allied Tactical Air Forces consist of units of every Western European air force and are closely integrated to provide a unified whole. During the past year all Continental air forces have undergone considerable expansion and it has been gratifying to note that their quality has not deteriorated as a consequence. Regular large-scale exercises have assisted all concerned to reach a genuine operational standard and 2nd T.A.F. is now absolutely on the top line, in spite of the—necessary and valuable—influx of National Service aircrew.

Like Fighter Command, the 2nd T.A.F. is now in the process of major changes in equipment. They are on the point of forming squadrons of Sabres and already have a fair number of Venoms—mainly single-seaters—in service. All these new aircraft, and probably some Swifts, will be put to the test in this year's international exercises.

Altogether, both Fighter Command and 2nd T.A.F. have a heartening feeling of knowing their job and have confidence in their ability to do it efficiently. This is by no means a state of affairs to be accepted without thought, for the time-and-space factor is pressing ever more heavily upon all fighter forces. Procedures generally resemble those of World War II, but are more streamlined; everything, in fact, happens faster than it used to. English is, of course, the NATO language and British fighter-control procedures are standard in large-scale exercises.

These exercises have proved of immense value to the Royal Air Force and, almost without exception, they have confirmed recent trends of thought. As a result, Fighter "top brass" knows just what it can do, and what it will be able to do with the supersonic equipment now becoming available. Big exercises are keenly looked forward to by all concerned for they provide a sure index of one's capabilities and give one the self-confidence so necessary in such work. Even in artificial peacetime conditions, they provide a very close approach to the stress and strain of war, and the Royal Air Force has no doubts as to its capacity to cope with any conditions.



This de Havilland Venom F.B.1 was photographed over Germany during Exercise "Hold Fast."

"Flight" photographs

But Fighter Command's present work is done from relatively peaceful British airfields, where the regular fighter pilot can live in his house with his family and keep something approaching regular hours. In fact, the Command is getting back to the halcyon days of the 1930s—but only in some respects. Then, it was the custom for one pilot to fly his own aircraft, which was maintained by one servicing crew—who, as a consequence, took a great individual pride in "their" kite; now, however, such arrangements have been made quite impracticable by the increasing complexity of modern fighters, and the necessity of doing as much flying as possible, irrespective of aircraft serviceability states. Formerly, a rigger and a fitter could do literally 99 per

These Gloster Meteor 8s equip No. 43 Squadron—"The Fighting Cocks."

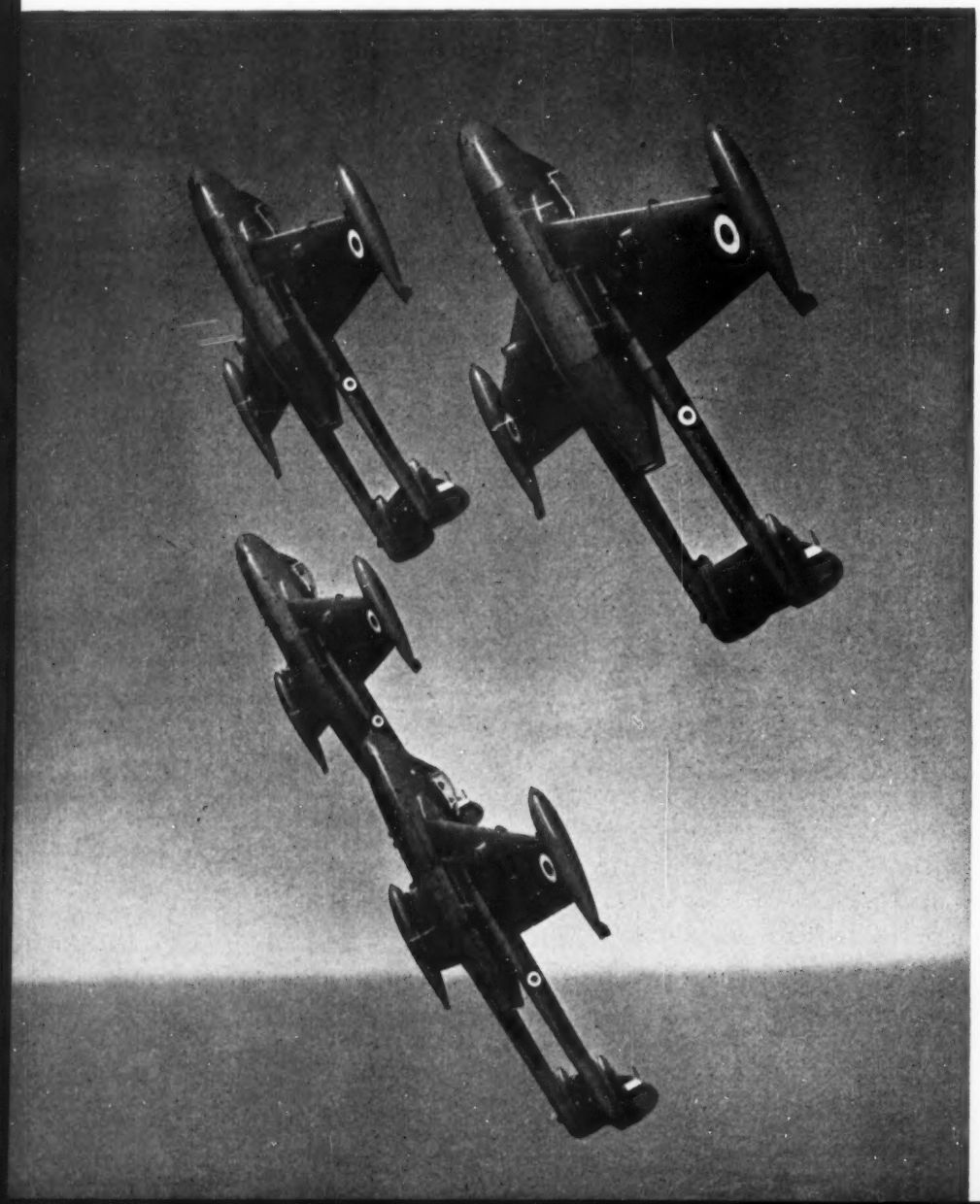
The Queen's Air Forces . . .

cent of the work required to keep aircraft in the air; today a huge army of specialists is required who can only be part of a centralized station pool, called upon as required. A modern fighter squadron has about 130 men on its own normal peacetime establishment who administer its daily needs; all the other requirements are met by permanent base personnel.

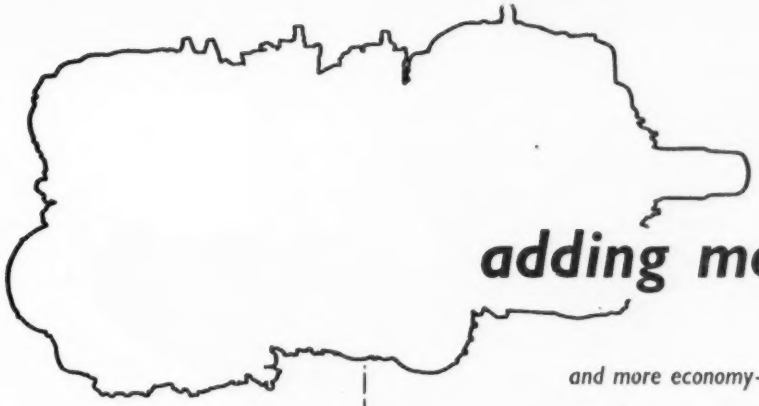
Once a pilot has become quite familiar with his mount, he is now likely to log hours far more rapidly than he would have done five years ago. Much of the time will be on straightforward flying such as formation practice, aerobatics or low-level cross-countries. Added to this he will carry out air-to-air firing against sleeve or glider targets, or air-to-ground cannon and rocket work. For the latter he will probably go to a coastal range, and much additional strafing practice is obtained at armament practice camps at home and abroad. In big exercises he may find himself intercepting bombers, when his prowess will be recorded by his cine-camera. Night and all-weather pilots, with their radar-observer navigators, may be engaged in strafing ships, intercepting low-altitude minelaying aircraft, or finding jet bombers at 40,000ft. On top of these varied tasks are the inevitable, and popular, fly-pasts and public displays. Such calls on pilots' time are likely to be very heavy this year.

Today, our fighter pilots are pleased with their equipment and are not short of anything that they consider necessary. The standard grey flying suit is a comfortable article of attire, bearing the wearer's squadron badge on the left breast pocket. The suit is not pressurized, nor does there appear to be any requirement for such clothing yet—although it will be there when it is needed. Hard helmets are, of course, a bone of contention just now. Many Fighter Command pilots, particularly those who have been on exchange posting with the U.S.A.F., have worn—and perhaps acquired—a nice white Lombard helmet. Unfortunately, this item will not fit neatly over our leather helmet with projecting R/T head-set, and the American earphone and microphone will not plug in to a British cockpit. The main reasons for hard helmets are to prevent concussion as a result of hitting the head on the canopy during high-speed flight in turbulent air, and to increase chances of survival after forced descents to the sea or to rough ground. Discussion with many interested crews has failed to establish definite views; suffice to say that British helmets are being developed (in the Royal Navy they are in use) and, although they restrict the pilot's head-movement and make life generally less comfortable, the "spaceman look" will soon be a familiar sight in Fighter Command.

Other standard equipment can include dinghy, pressure mask, vizor or eyeshield, knife (worn on the left upper arm), seat or back-type parachute according to the type of ejection seat used, mae west, g-suit, "38" pistol and a host of odds and ends. The whole lot weighs around 120 lb and is a far cry from the 1940 flying suit (worn or left off according to conditions), parachute, leather helmet and—an item still very popular—a brightly coloured scarf. As for running several hundred yards to the aircraft in true "scramble" tradition, it is doubtful if anyone in the Command



De Havilland Venom F.B.1s of the Second Tactical Air Force pull up into a high-speed loop over Wunstorf. Large numbers of these single-seaters are already in service; they will very soon be joined by two-seat all-weather Venoms with extended dorsal fins.



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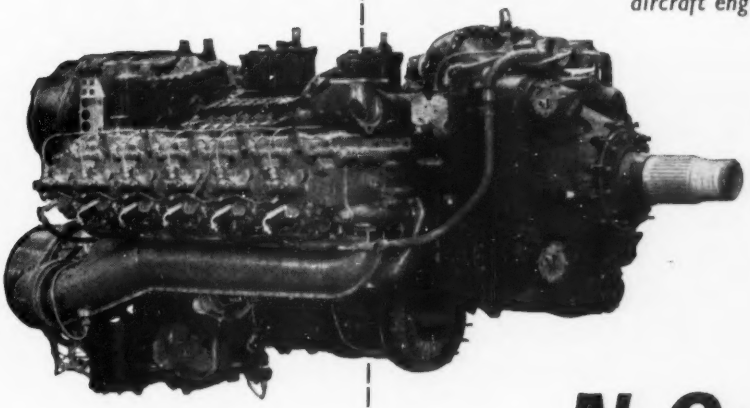

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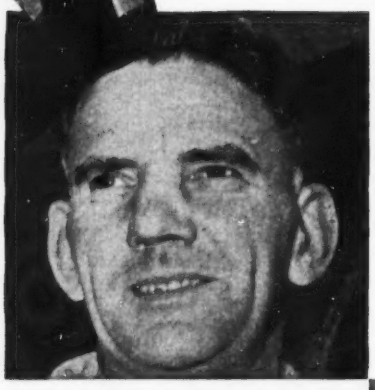
the pilot



Only 16 when he had his first experience of 'planes, J. H. (" Jimmy ") Orrell, Chief Test Pilot, of A. V. Roe & Co. Limited, has to date logged over 8,000 flying hours. Besides the Lancaster, he has had a hand in the development of the Lancastrian, the Lincoln—and more recently — of the Tudor Series and the C.102 Jetliner. Rejoined Avro after various charter and ferrying jobs in 1942, and has been with them ever since. On the Shell and BP Aviation Service he comments " even in the smallest place the service has been good ".

Shell and BP Aviation Service

Pilots all say the same: Shell and BP Aviation Service is first-class. Always punctual. Always helpful. Always cheerfully on the spot at Britain's major airfields. And — quite as important — every crew is a positive mine of local information. No wonder that for all kinds of operators the familiar Shell and BP fueller is *always* a very welcome sight.

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Fastest aircraft in R.A.F. service is the Canadair Sabre F.1, large numbers of which are entering service with the 2nd T.A.F. and, later, with Fighter Command. The nearest aircraft carries the standard glossy grey-green camouflage.

Representative of the many hundreds of aircrew of Fighter Command are the Vampire N.F.10 crew shown boarding their aircraft for a night exercise: F/L. J. H. Hedger, a flight commander of 23 Squadron, and his navigator, P/O. M. S. Troake.

"Flight" photograph

The Queen's Air Forces . . .

could do it with full equipment. Even if he could, it is considered physiologically bad to get "in a lather" before a flight.

All this may sound as though the carefree era of piston-engined flying has gone for ever, to be replaced by a routine in which a fighter pilot is transported to his aircraft and flies entirely by means of instruments, graphs, cathode-ray tube traces and radio mumbo-jumbo. Wondering if the old hands felt this to be the case, we recently sought an interview by Air Marshal Sir Dermot A. Boyle, K.B.E., C.B., A.F.C., who has lately been appointed A.O.C-in-C. Fighter Command, in succession to Sir Basil Embry. Sir Dermot was quite specific: "It's what the youngster thinks that matters. He isn't concerned with what it was like to fly a Spitfire; he probably thinks such aircraft old crates. High-altitude flight makes any man feel just a little bit older and, even in modern pressurized fighters, we aim at a low age-limit. There are plenty of young people, of the right type, entering the Command all the time; they are showing themselves fully capable of coping with everything."

And this is as it should be, for Fighter Command is a fine place for "young men of the right type." Perhaps our present fighter pilots will end their Service as chairborne missile-directors; but they are certainly doing a particularly active job at the moment.

THE ROYAL OBSERVER CORPS

CLOSELY linked with Fighter Command is the Royal Observer Corps, whose duties are by now well known. It is of passing interest to note that their badge pictures a watchman of a former Elizabethan era, scanning the horizon for an invading Armada. Horizon scanning is once more becoming of prime importance for the earlier reporting of low-level "rats" is now an urgent problem.

But the R.O.C. is all right; last October we wrote: "a full season of exercises had worked wonders with last winter's recruits and, during the four days and three nights of R.O.C. participation in Exercise Ardent, they put through plots to centre with speed and accuracy that would not have disgraced the post in its World War II heyday." And earlier this month the R.O.C.'s first long-service medals were presented to 20 members of the corps who enrolled in the early 1930s by the A.O.C-in-C. Fighter Command, who, with justification, referred to their work as "a vital job."

The Corps has increased both in numbers and in enthusiasm during the past year. Their proficiency is underlined by the increasing numbers who take the Master Test (pass mark, 90 per cent) and one post, at least, gained five of the prized Spitfire badges from the last examination. The Commandant, A. Cdre. G. A. Vasse, C.B.E., also sees to it that posts keep on their toes during actual operations; any plot taking as long as 30 seconds is likely to earn a reprimand for the observers concerned.

Soon to be only a memory for older aircrew and groundcrew : the Lincoln, last of a famous line.

THE QUEEN'S AIR FORCES . . .

BOMBER COMMAND

IN order of precedence, Bomber Command is officially recognized as having pride of place over all others in the R.A.F. A senior officer in the Command told us recently that everyone in the squadrons believes in "Bomber" and is immensely proud of belonging to it. Such an outlook is of supreme importance to a military formation which is so completely dependent for its operational success upon the work of small, highly-skilled detachments—the individual crews of its aircraft. Teamwork is, in fact, the very life-blood of the Command, whether it be among the fitters, armourers or radar mechanics who service the Canberras, Washingtons and Lincolns, or the crew-specialists who together with their pilots operate these complex machines which are the R.A.F. bombers of today.

Those who achieve success against heavy odds develop strength and resourcefulness. After the war Bomber Command suffered a more complete run-down than any other, and for several years had little enough in the way of encouragement, new equipment or useful flying to keep up its spirits. Today a new and vital organization has been built up which is fast expanding and increasing in efficiency and power. It will never strike the first blow, but it intends to carry such powers of retaliation that no hostile blow will be struck to provoke it.

The squadrons of Bomber Command are formed into two groups, the division being largely a matter of geographical location. There are no "Base" sub-divisions of command as in war-time, but three or more squadrons inhabit most bomber stations and answer direct to Group H.Q.

Re-equipment with new aircraft—long overdue—is now taking place quite rapidly, and the first jets, the Canberra B.2 light bombers now coming into service, are not only replacing the old-type "heavies," but are equipping newly-formed squadrons as well. A small number of squadrons of Lincolns and Washingtons will remain in service until replaced by Valiants.

But this picture is not by any means a depressing one, for Bomber Command is in process of developing intensively its new procedures and methods, new equipment and new tactics. It is finally leaving behind the 20,000ft, 200 m.p.h. era, and changing over to 40,000 or more feet and 500 m.p.h. Such an advance needs time and experience to achieve.

Sweet-to-handle Canberras provide an ideal introductory step to the four-engined jet bomber. Valiants will, it is thought, carry a crew similar to that required in the present four-engined types (less gunners), and, in the meantime, these old aircraft can carry such new equipment—navigational and bombing—as is available for trial or to give the crews experience in the new blind-bombing techniques. The day of the visually marked target is fast passing, and accurate "blind" bombing from high-speed, high-altitude aircraft in all weather conditions is the aim.

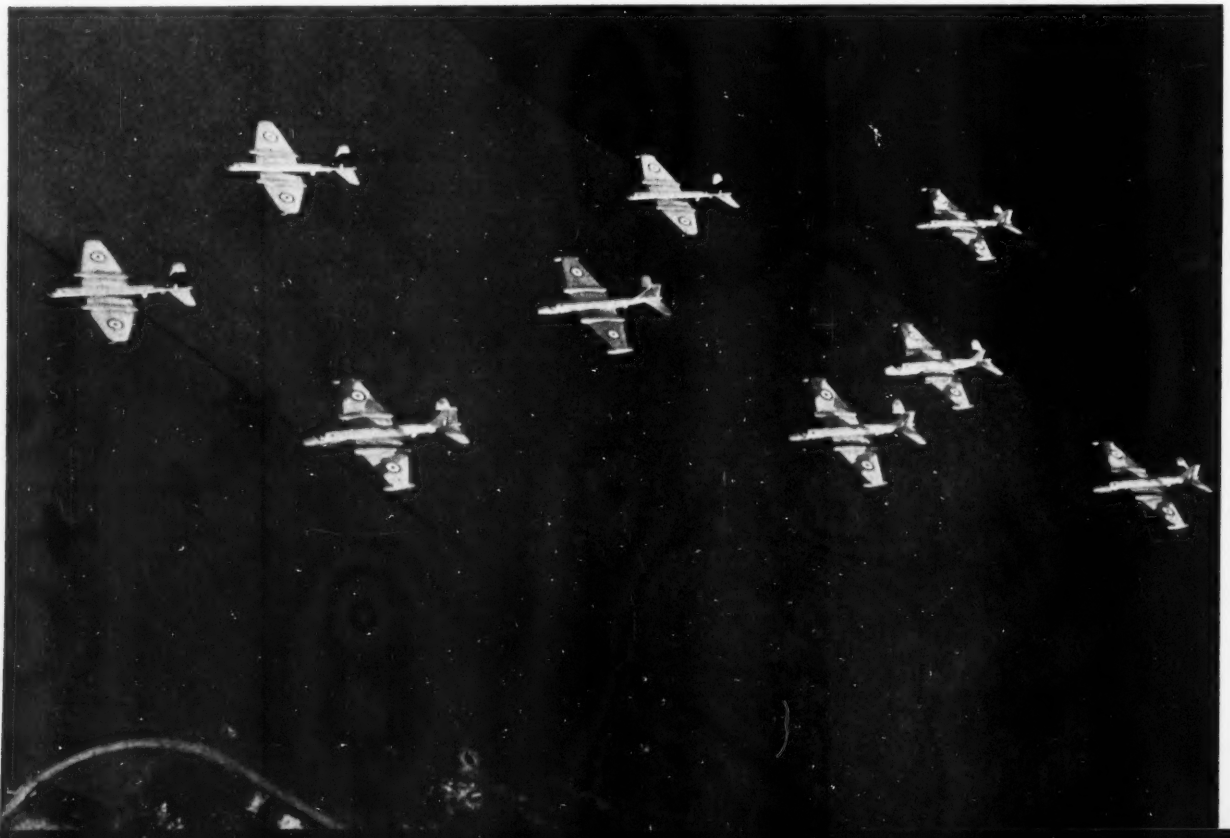
Thus we find that Lincoln and Washington squadrons carry out regular blind-bombing exercises with simulated operational conditions before and after the "attack." Instead of a practice bomb being dropped—for it is not always convenient or practical to do so—a photograph may be taken. A "snap" of the radar screen in the aircraft—with, in addition perhaps, a ground-radar fix of the machine itself at the moment of bomb release—enable the accuracy of the attack to be assessed and cross-checked.

Periods of training often culminate in participation in an exercise such as that recently organized under the code-name Jungle King. Here everything possible was done to simulate war-time operational conditions. A member of *Flight*'s staff took part in a raid by a typical Washington squadron based at R.A.F. station Marham. Some extracts of his report were as follows :

"Proceedings opened with the various special briefings for individual members of the crews. . . . We saw that the target was Wunstorf. . . . The briefing was by W/C. H. N. G. Wheeler, D.S.O., O.B.E., D.F.C., in the presence of the station commander, G/C. O. R. Donaldson, D.S.O., O.B.E., D.F.C.

"Our aircraft was U-Uncle. In front of the big machine was

A striking aerial photograph indicative of Bomber Command's growing jet strength—Canberras from Binbrook in various camouflage schemes.
"Flight" photograph



spread a "prayer mat," and on this was laid all the safety and other equipment carried by the crew, so that a thorough check could be made by the captain of the aircraft—F/L. F. Dyke—an Australian pilot of some 8,000 hours' experience.

"The interior of a Washington is extremely capacious and well-appointed. Each pilot has his position, equipped with full flying controls and instruments: between them is the bombardier's station, complete with bomb-sight, radio altimeter and all the necessary gadgets of his trade. Behind the co-pilot is the admirably-instrumented engineer's position, and opposite him sits the navigator, operating with chart and Gee-box.

"Captain and co-pilot set to work with the check-list as soon as we were all installed, and a few minutes later the big Cyclone R-3350s broke, one by one, into life. . . . At 1750 hr, dead on time, F/L. Dyke swung the aircraft into position, and we accelerated rapidly into the air under the influence of 2,000 b.h.p. from each engine . . . as the sun sank gradually behind us, we set course in an E.N.E. direction for position C—the point from which we were to turn into the coast for our attack. At 1906 the final vestige of daylight faded, and the stars shone brightly in a clear sky. We levelled out at 19,600ft at 180 m.p.h. I.A.S. Soon afterwards the cloud below began to break, and the lights of the coast came into view. At this point the radio-altimeter was checked, and I was allowed to manipulate the green, wavering, phosphorescent circle that swam into view, and obtain a reading from the blip that spoiled the symmetry of the trace. We were at 20,500ft—and a pleasantly warm breeze was blowing through the cockpit from the diffusers in the nose. At 1919 we crossed the coast and the faithful blip on the altimeter registered 15ft or so less—a most admirable instrument. . . .

"Navigation had been by radar fixes over Germany, and soon the navigator came up to the nose for the bombing run, and I was able to examine the radar-repeater screen fitted in his position—and make precisely nothing of what I saw! Over the intercom one could hear the "steadies" being given to the captain as the target drew nearer. At 2003 hr the "bombs" were released.

"At 2031 the gun-turret switches were turned off, and half an hour later we again crossed the coast and started our descent at an air speed of 220 m.p.h. Back in the nose, I was able to listen in to V.H.F. control from Marham tower, and hear the aircraft being "stacked" before landing. We were ordered to 5,500ft.

"Slowly we dropped down, stage by stage—and the misty-red moon disappeared as the turbulent cloud swept up to meet us. Then at last came 2,000ft, and a change of frequency over to G.C.A. In we came towards the airfield, talked down and down by the confident voice. . . . The trip was over—or, at least, all over bar the de-briefing."

Another member of *Flight*'s staff flew with a Canberra B.2 squadron from Binbrook when a raid was made on an airfield at Bremen. From his impressions we recall the following:—

"From the clothing store we drew a selection of new and expensive-looking equipment: helmet, mask, pressure waistcoat, flying overalls, gauntlets, suede boots and long woollen stockings. Unfamiliar items are the pressure-fed mask and waistcoat—equipment necessitated by the possibility of pressure-cabin failure at altitudes above 40,000ft. . . .

"A 'B' form, calling for an attack that evening, had arrived from Group H.Q., and the general briefing of crews was about to begin. The commanding officer, S/L. J. C. M. Mountford, A.F.C., added a sweater, Mae West and woollen mittens to my equipment, and we joined the crew—Sgt. Plt. Kenneth Neate and F/O. Kenneth Hancock (navigator)—in the briefing room. Maps and flight-plans, issued 30 minutes earlier at the specialist briefing, were already spread out on the briefing-room tables.

"The Canberras' attack would take the form of a shallow penetration routed to avoid the enemy's defences. One by one, briefing officers took their place on the rostrum to issue information, instructions and advice on navigation, radar, bombing, signals, intelligence, meteorology and air-traffic control. Speeches were quick and to the point, with crisp interpolations from the wing commander flying. . . .

"Very soon crews were disembarking from cars, trucks and Land-Rovers at various dispersal points, exchanging final words with ground staff and climbing aboard their aircraft. . . . Sole admittance to the Canberra crew-section is by the pressure-sealed door on the right-hand side of the nose; parallel to the door, but on the left, is the pilot's ejector-seat. Similar seats, placed side-by-side, are provided aft for the two navigators. While Sgt. Neate began his cockpit checks I attached dinghy to Mae West, buckled up the parachute and seat harness and plugged in intercom and oxygen leads.

"Flight" photograph

Canberra B.2s such as these are replacing older types and equipping newly formed squadrons.

"At 1759 hr, precisely on schedule, the Canberra accelerated down the runway. By 1800 hr the cockpit had grown brighter, indicating that we were rapidly leaving behind us not only the airfield but the cloud layer which covered it. Apart from a surprisingly gentle pressure on the back, there was no other sensation. Away in front two brown contrails revealed companions from Binbrook *en route* for Bremen. We reached our cruising height of some eight miles in less time than it would take to smoke a cigarette. At altitude, the Canberra is rock-steady and only the hiss of air betrays motion through the rarefied atmosphere. We cruised at a constant Mach reading of 0.7 plus, which, allowing for height and an outside air temperature of −62 deg C, meant over 500 m.p.h.

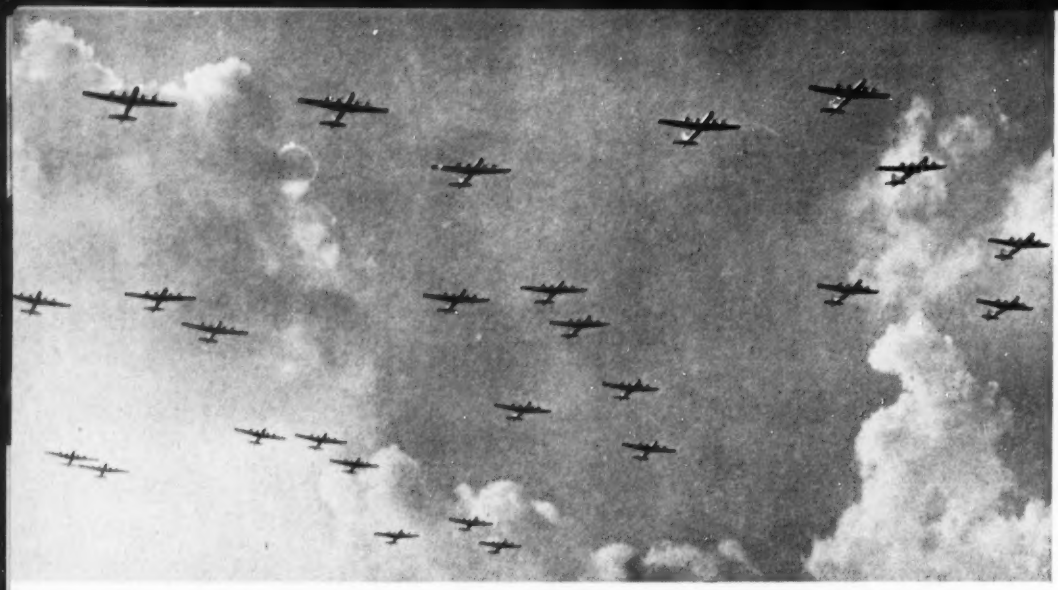
"Absence of cloud in the target area did not affect our instructions to make a simulated blind-bombing attack. Only 45 minutes had passed since take-off. The crew, concentrating on their instruments to ensure perfect accuracy, could hardly spare a second to glance at the ground; the clear-vision bombing position in the nose remained unoccupied and F/O. Hancock continued to direct the pilot from the navigator-plotter's seat. Normally the run over the target is controlled by a third crew member—the observer, who assists with *en route* navigation.

"Having disposed of our "bomb load," we were able to decrease further the chances of interception by adding 5,000ft to our cruising height. Despite the very impressive figure already shown on the altimeter, the climb was effortless and very quick indeed. By now, condensed moisture in the cabin had frozen and formed a glaze on every metal surface, but the interior remained warm. Air tapped from the Avon compressors kept the cabin "altitude" below 25,000ft.

"Listening-out for a possible order to divert, we turned on navigation lights and began a rapid descent 50 miles from base to the holding altitude—30,000ft. Sgt. Neate began the descent at increased Mach number. Dive-brakes were extended, steepening the dive, and we continued to shed height.

"We pulled out over the cloud-blanket covering Spurn Head, the Humber and Grimsby, and flew on at 30,000ft beyond Binbrook to Lincoln. Above us were contrails, like chalk marks on black velvet, marking the homeward path of other Binbrook Canberras.

Permission to descend and turn into the G.C.A. pattern was refused, since other aircraft were just taking their place in this part of the landing queue. We orbited once and again called "overhead"; this time our Canberra was accepted and we began a 5,000ft/min descent at a specified Mach number, soon turning on to course for



Large formations of piston-engined bombers are practically a thing of the past; but there is still plenty of useful work to be done by the remaining Washington squadrons, as pictured above, and Lincoln squadrons of Bomber Command.

the airfield at the appointed height, for our aircraft, of 17,000ft.

"Cloud-base at Binbrook was only 300-400ft, with 2,000yd visibility, and the pilot prepared for a ground-controlled approach. As the Canberra scudded into cloud a few miles from the runway, with dive-brakes extended to reduce speed, the reassuring voice of the controller came through. . . ."

There are other units and aircraft in Bomber Command: for example, photo-reconnaissance forms a small but most important part of the work. Canberras—P.R.3s—are coming into service for this duty, too, and well suited to replace the few remaining Mosquitoes they are.

Still another Canberra duty is that of conversion to jet bombers—at present undertaken at Bassingbourne. Pending the delivery of dual-control trainer versions, ordinary B.2s are used, the instructor first demonstrating the procedure then remaining beside the pilot to talk him round his first few circuits.

The majority of pilots joining bomber squadrons are newly trained and have no experience of squadron life. They require conversion, additional operational training and, particularly, further practice in instrument flying and procedures. Other than this they, like all other pilots, need frequent and regular flying to keep themselves at peak efficiency.

For all this flying, the squadrons depend heavily upon their willing but scarce ground-crews. As the numbers of aircraft build up, so must the specialists to maintain them. There are still all-too-few skilled men in Bomber Command, and in particular there is a need for those whose work it is to keep the special navigation and blind-bombing equipment serviceable.

The need for practice and independent checking of instrument flying—regularly and economically—has resulted in the use of dual-control Meteor 7s for this work. Several are allocated to each bomber station, and they are well-enough suited to this job.

Little trouble is experienced by pilots converting from the old piston-engined bombers to Canberras.

To stimulate the natural desire to improve personal standards and knowledge, incentives are offered to highly qualified captains and crews in Bomber Command. To start with, a squadron crew is classified as non-operational; as experience is gained and proficiency increases the crew becomes operational and later still may be classed as "select." Select crews are permitted to make long-distance training flights at regular intervals to overseas airfields of their own choosing—from an approved list which includes such places as Khartoum, Nairobi, Aden, Gibraltar.

Year by year squadrons compete in a visual night-bombing competition for the Laurence Minot Trophy. In 1952 each squadron was required to nominate a different crew for each of the four nights of the contest, and these crews carried out a flight of about five hours' duration, during which attacks were made with 25 lb practice bombs on four different targets. Only one run-up was permitted. The winners were No. 90 Squadron, commanded by S L. W. R. Sloane (and followed closely by No. 393 Squadron of the United States Third Air Force). No. 7 Squadron has won the Trophy eight times since 1927.

Bomber Command has started upon a long period of intense development and training—and thus one of intense interest, and activity. By the time Canberras are plentiful, Valiants in service and the latest V-bombers ready, the squadrons must know how to operate them all to the best advantage, to bomb accurately from them, whether in groups with conventional weapons or individually with an atomic bomb, and to land back at base without fuss or delay. They must also have reached a state of proficiency which will ensure first-time success in operations and minimize accidents with the expensive and complicated jet bombers which are soon to form the cream of equipment in the R.A.F.'s most powerful Command.

Though the numbers of large jet bombers may be relatively few in the future they will, in the words of the late C.A.S., be "superlative weapons." Battleships and tanks have their place, but it is the jet bombers which will constitute the country's most powerful war-winning force.

Within the structure of Bomber Command are included photo reconnaissance squadrons soon to be re-equipped with the P.R.3 version of the Canberra here illustrated.

A scene typical of Coastal Command. Sunderlands of 230 Squadron, five of which assisted in the British North Greenland Expedition in August, 1952.

THE QUEEN'S AIR FORCES . . .

COASTAL COMMAND

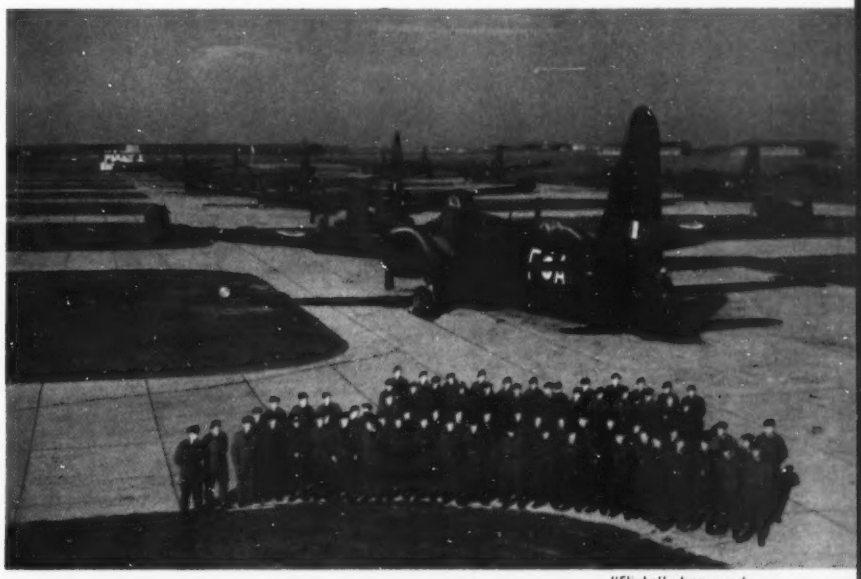
AN unexpected opening on to a quiet Middlesex lane some 50 miles from the sea presents passers-by with an arresting and unusual notice. "Headquarters Air Commander-in-Chief, Eastern Atlantic Area, Atlantic Command," it begins. "Headquarters Coastal Command, Royal Air Force," it continues. "Headquarters Allied Maritime Air Commander-in-Chief, Channel Command," it concludes. The unit to which these three descriptions apply is clearly an important place.

The notice underlines the international responsibilities held by Coastal Command in 1953. Its Air Officer Commanding-in-Chief, Air Marshal Sir Alick C. Stevens, holds also the two NATO appointments mentioned above, and in fact most of the Command's Headquarters staff also "wear three hats"—one R.A.F. and two NATO.

Within this international framework, the work of Coastal Command remains of extreme importance to an island country such as Britain in time of war; and in peacetime it provides effective and comprehensive services the existence of which is not generally appreciated. The Command's main tasks may be defined briefly as trade protection (merchant shipping protection and reconnaissance), meteorological reconnaissance and search and rescue. Under the embracing designation of "maritime reconnaissance," the Coastal squadrons of Sunderlands, Lancasters, Shackletons and Neptunes continue to carry out the many specialized duties implied in these tasks. (The first three of these types are illustrated in our colour pages.) Organization of the Command divides it into four components; 18 and 19 groups, with Headquarters at Pitreavie, Fife, and Plymouth respectively; R.A.F. Gibraltar, and Maritime Air Headquarters, Chatham.

The primary rôles are, of course, anti-submarine warfare and the protection of shipping, while meteorological and search and rescue work are secondary duties. The under-water range and speed of modern submarines are already much greater than those of the wartime U-boats, and so improved aircraft and equipment, and exceptionally thorough training, are required to combat these dangers. As submarines spend less time on the surface, the number of sightings decreases, and hence for adequate protection the number of kills per sighting must be improved.

To this end, many exercises in anti-submarine and anti-surface vessel operations are carried out—in which the latest radar and other equipment is tested—in the closest co-operation with Naval units. The two-year expansion programme now being completed has resulted in a usefully increased amount of flying activity, and has run parallel with the introduction of newer types of aircraft, such as the Shackleton and the Neptune. Lancaster squadrons have been converting to these two types, and in addition new squadrons are being formed. During Exercise Mainbrace last year, Shackletons of 120 and 240 Squadrons and Sunderlands of 230 Squadron performed excellent fleet co-operation work, flying from Norwegian bases.

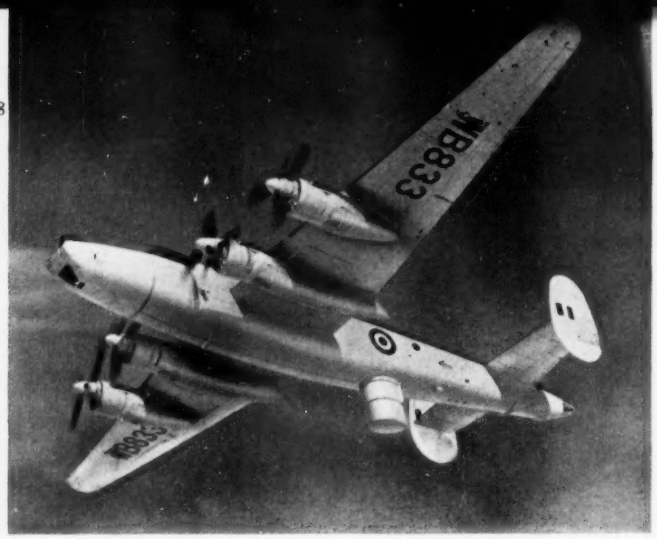


"Flight" photograph

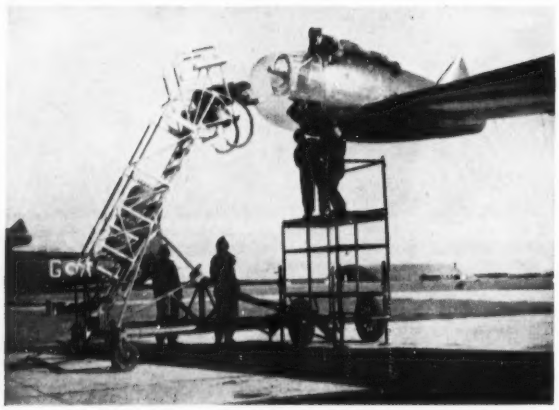
First Neptune squadron to be formed was No. 217. Here, squadron aircrews, ground crews and machines are pictured at a Scottish base.

Numerically it is the Shackletons which form the mainstay of the Coastal Command squadrons, including the only permanent overseas unit at Gibraltar, commanded by S/L. G. L. Mattey, D.F.C. The usefulness of the flying-boat, however, has never been in doubt in this Command, and the Sunderland squadrons, used for anti-submarine work, continue to justify this faith. One outstanding feat was the "Arctic Airlift" performed last August by five Sunderlands of 230 Squadron, under the command of S/L. J. S. Higgins, D.F.C., A.F.C., in which 150 tons of stores, passengers and dogs were transported in support of the British North Greenland Expedition, in the face of extreme natural difficulties. Although the Sunderland continues to do good work, the development of a modern replacement flying-boat would seem to be a necessary step in the near future.

The introduction of an American aircraft—the Lockheed P2V-5 Neptune—into Coastal Command has been enthusiasti-



The two major shore-based aircraft in Coastal Command. (Left) A Neptune flies low through bad weather off the Norwegian coast. (Right) The improved Mk 2 Shackleton.



Ground servicing of a 217 Squadron Neptune, showing refuelling, adjustment of the starboard fuel-radar-searchlight wingtip nacelle, and maintenance on one of the turbo-compound engines.

cally welcomed by the crews who fly these machines. After the ferrying of the first two such aircraft by Coastal Command crews, from Lockheed's Burbank factory to this country in January of last year, S/L. M. A. Ensor, D.S.O., D.F.C., took up command of the first R.A.F. Neptune squadron, No. 217. Much useful operating experience on the type has since been obtained. Although there is much interchangeability of duties between particular aircraft types, the Neptune—an extremely versatile aircraft—is at present used for the relatively shorter maritime patrols.

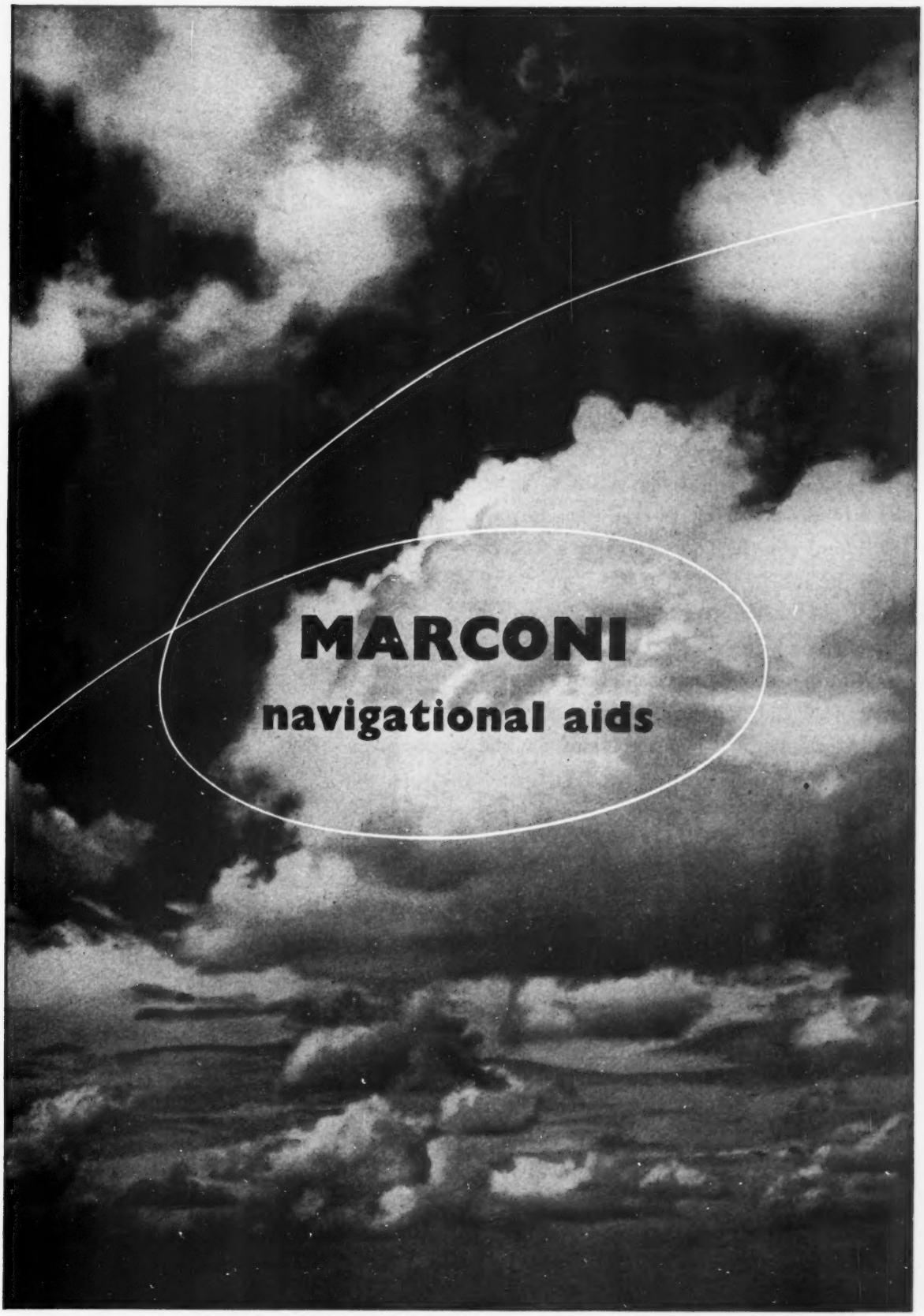
One of the most important post-war operational developments has been the increased mobility and flexibility of Coastal Command units, as shown in the several long-range flights which have been made by Sunderlands and Shackletons, including those to Canada, the West Indies and Ceylon. Fully operational, self-contained units are able to be moved quickly and effectively almost as a matter of routine—an obviously useful contribution to our NATO efforts.

Because of the high specialization both in equipment used and in duties performed, Coastal Command crews must receive the most thorough training possible. Individual training in the Command's own special subjects and techniques, including over-sea reconnaissance and navigation, is given at the School of Maritime Reconnaissance at St. Mawgan, while crew training is continued at the appropriate O.C.U.s where, after type conversion, advanced operational training is given. From the squadrons, crews (together with their own aircraft) attend courses at the Joint Anti-Submarine School at Londonderry.

The search-and-rescue facilities and responsibilities of Coastal Command are much wider than is commonly supposed. Under I.C.A.O., the responsibility for controlling search and rescue in Britain and the surrounding waters belongs to Coastal Command; this includes searches for shipping, civil aircraft, and lost mountaineers—in fact, all who need such assistance from the air. This control is performed through three rescue co-ordination centres at Pitreavie, Plymouth and Aldergrove, Northern Ireland, respectively. A number of aircraft are kept at immediate readiness, some with airborne lifeboats, on the south coast and in Northern Ireland, and in emergency all bases can provide search aircraft at extremely short notice. The three centres maintain close liaison with the air-traffic control centres, other R.A.F. commands, the Navy, the U.S.A.F., the Meteorological Office's weather ships, and the National Lifeboats and, of course, with Coastal Command's own marine-craft units situated around the coast. By means of broadcasts to merchant shipping, sea rescues can be greatly facilitated; on one recent occasion, the *Queen Mary* was thus diverted for search purposes. Able to call upon the R.A.F.'s volunteer mountain rescue teams for mountain emergencies, the centres are well able to co-ordinate many efforts to the best advantage.

Marine-craft units around the coast—manned by (if we may put it thus) the Command's web-footed, rather than feathered, personnel—include converted minesweepers and smaller craft: all perform numerous duties including target-towing and recovery, weapons recovery, range safety duties, control of anti-submarine exercises, and search and rescue.

All these—the flying-boats, shore-based aircraft, marine craft and search and rescue units, in the hands of experienced and responsible air, sea and ground crews and personnel—together form a balanced team which, with close Naval co-operation, ensures protection for this country's trade and help for those in need of rescue. Past experience in carrying out such tasks for this country alone has enabled the Command to face its new NATO responsibilities effectively. With these wider international commitments, Coastal Command deserves full recognition for the part it is playing in the scheme of Western Defence.



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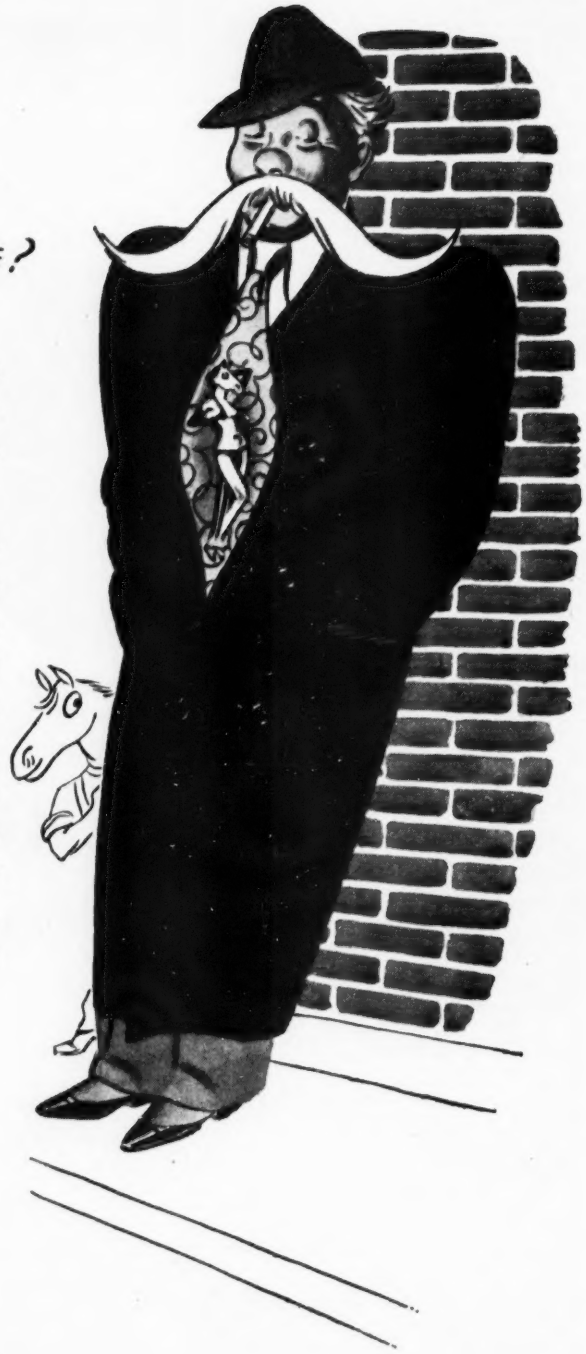

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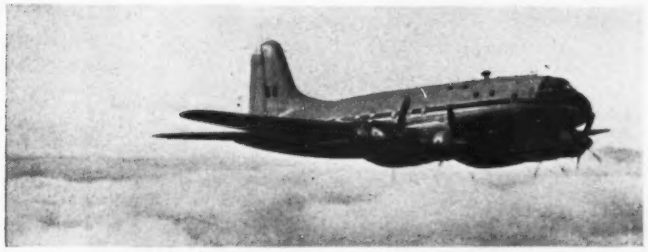


THE QUEEN'S AIR FORCES . . .

TRANSPORT COMMAND

TRANSPORT COMMAND reached its peak quite soon after its formation in 1943, and the scale of its activities has long since been reduced by peace-time budgets. But it has remained "the Command which never stops work." Its hard-pressed members find little time in which to look back sadly on the days when Transport Command had no fewer than 12 groups and 58 squadrons.

Transport Command is the first to be called in whenever Service men or materials have to be moved quickly—and always at short notice—to an area where peace is threatened. In these uneasy post-war years there have been all too many examples of how air transport, effectively used, can prevent a cold war from growing warmer. Perhaps *Plainfare*, the R.A.F. contribution to the Berlin Airlift, was the outstanding example, but several others come to mind.

The manifold duties of the Command can be studied under three distinct headings : route flying, tactical support and ferrying. In common with other commands, it must also ensure that, in case of war, its crews are trained to the highest possible standard of skill and adaptability.

Like a regular airline, Transport Command keeps up a flow of scheduled services between important traffic-centres, the schedules being worked out at least a month ahead. The Air Ministry allocates "payload"—both passengers and freight—on a priority basis. Hastings and, to a lesser extent, Valettas, are used exclusively "on the line," operating daily to the Middle East, twice a week to Singapore, every 10 days to Japan (returning with casualties from Korea) and twice monthly to Australia. One of the Singapore services flies a monthly shuttle to Ceylon (which, incidentally, is the setting of the attractive study of a Hastings in the colour section on page 661), and Hong Kong also receives a monthly visit. Transport Command also flies regularly through the Iron Curtain : every week a Valetta is routed through Germany to Warsaw, providing a courier and communications link for the British Embassy.

The Command must also offer a charter service, whose slogan might well be "Airlifts to anywhere at a moment's notice." Two specially equipped Hastings are allocated to long-range V.I.P. flights. Other aircraft are invariably engaged on special flights with men or materials urgently requiring transfer from one area to another, and it often becomes necessary to divert extra machines from the scheduled services. The recent "Operation Sandbag," when flood-repair work was dependent on the speedy shipment of 2½ million sandbags from as far afield as Italy and Switzerland, was a case in point. At Hendon, where the short-range communications squadron is based, Proctors, Ansons and Devons are available for the carriage of important civilians and senior officers of the three Services.

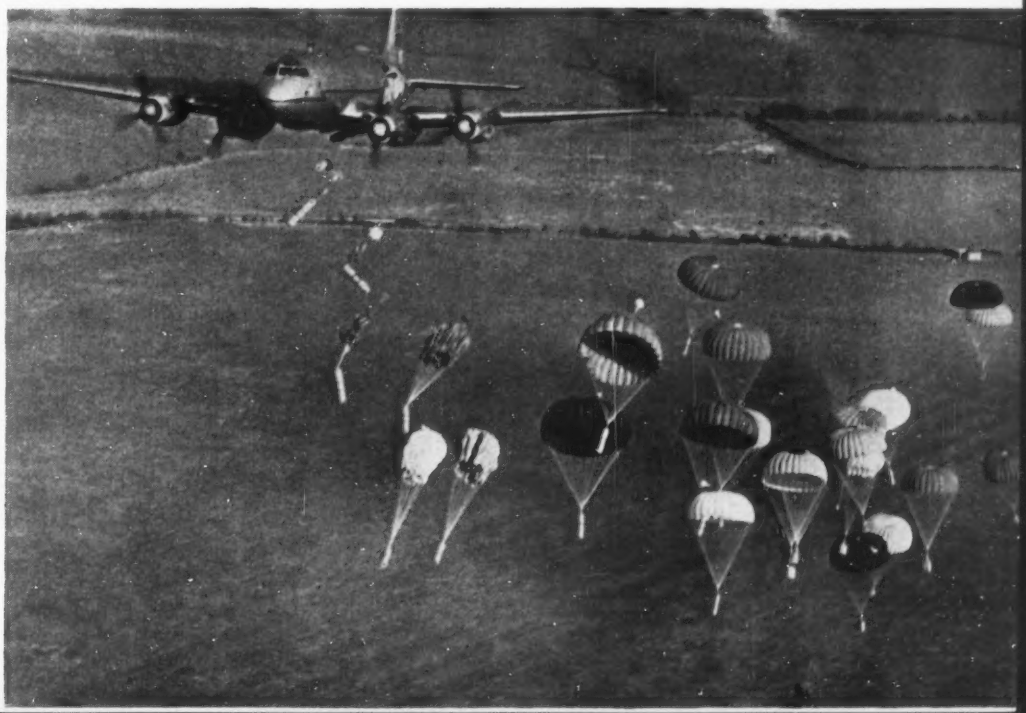
In addition to this taxi service, Hendon provides desk-bound pilots from the Air Ministry with "fly-yourself" facilities—means of transport and of keeping in regular flying practice.

To Transport Command falls regularly one of the most privileged and responsible tasks which could be given to any operator of transport aircraft—that of carrying H.M. the Queen and other members of the Royal Family. For this purpose a special unit, formed as the King's Flight and now known as the Queen's Flight, is maintained at Benson. The Flight has used Vikings since its formation in 1947.

Five aircraft, one of which is a reserve, are operated by the Flight; two Vikings are for the exclusive use of the Royal Family, and the remaining two carry other specially authorized passengers. Over the past 12 months the five Vikings have flown 1,000 hr—a considerable total, when it is realized that all non-essential flying is cut to a minimum.

The Command performs these varied and often conflicting tasks with a single force, and its ability to plan ahead is limited by the unpredictability of international events. In addition, it must meet two important requirements set by its air-support rôle : to train and exercise the Army's airborne forces, particularly paratroops; and to ensure that crews are experienced in support as well as route flying. No. 1 Parachute Training School, based at Abingdon, is responsible for maintaining the output of parachutists required by the Army, and other parts of the Command must be prepared to co-operate with ground forces when the need arises. Route flying, particularly under cold-war conditions, is inevitably the Command's major activity, but every effort is being made to provide crews with tactical-support training whenever possible.

The A.O.C.-in-C. Transport Command, Air Marshal C. E. N. Guest, C.B., C.B.E., has his headquarters at Upavon. This isolated grass airfield on Salisbury Plain is a link between the latest major command to be formed and the earliest days of British military flying. It was selected as the site of the Central Flying School in 1912, when it was noted that Upavon ". . . Apart from



In its dual rôle as a long-range transport (above) and a tactical-support aircraft (right), the Handley Page Hastings is giving valued service with Transport Command. The heading picture shows a V.I.P. Mk 4.

Operation Sandbag: During the recent floods Transport Command brought 2¾ million sandbags from overseas to aid repair work. Valettas are shown awaiting a consignment at Kloten Airport, Zürich.

The Queen's Air Forces . . .

its excellence as a flying ground . . . is situated in a lonely spot several miles from a railway station, and is therefore not liable to the inconvenience and danger of attracting large crowds of spectators."

Upavon's present occupants, though still some distance from civilization, control flights to practically every part of the world. Transport Command's operations are so diverse and far-ranging that a visit to the operations room at Upavon (where details of current flights cover hundreds of square feet of blackboard) is one of the best means of appreciating their scale and scope. Immediately obvious is the fact that at least one, and normally several, aircraft of the Command must be airborne at all hours of the day or night. The diversity of the tasks undertaken is most impressive, as shown by the following extracts from a recent daily summary of operations :—

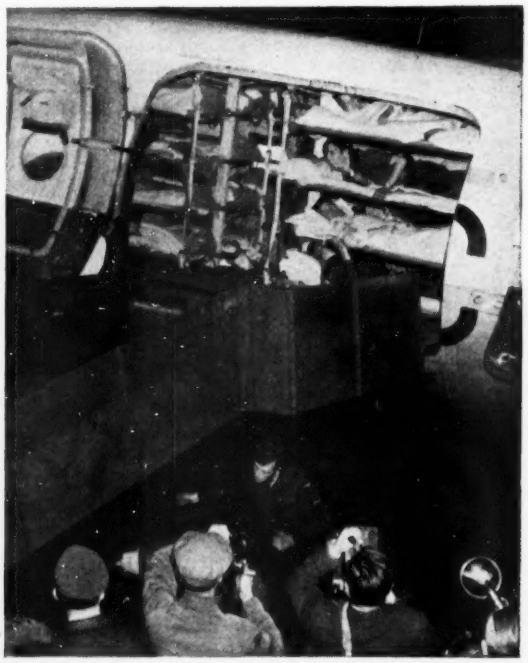
Aircraft	Route	Type of Flight
Viking	London-Hullavington	V.I.P.
Devon	Northolt-Dusseldorf	—
Dakota	Exeter-Fornebu	—
Dakota	Odiham-Villacoublay	—
3 Valettas	Hurn-Gutersloh	Transport
Anson	Dijon-Lyneham	Training
2 Tempests	Benson-Sylt	Ferry
Shackleton	Lyneham-Gibraltar	—
2 Meteors	Benson-Istres	—
Hornet	Istres-Luqa	—
Hastings	Keflavik-St. Eval	—
Hastings	Mauripur-Negombo	Scheduled
Hastings	Clark Field-Changi	—
4 Hastings	Shallufa-Lyneham	Passenger and freight*

* These aircraft were part of a large force of Hastings returning—with payloads—from a support exercise in the Middle East.

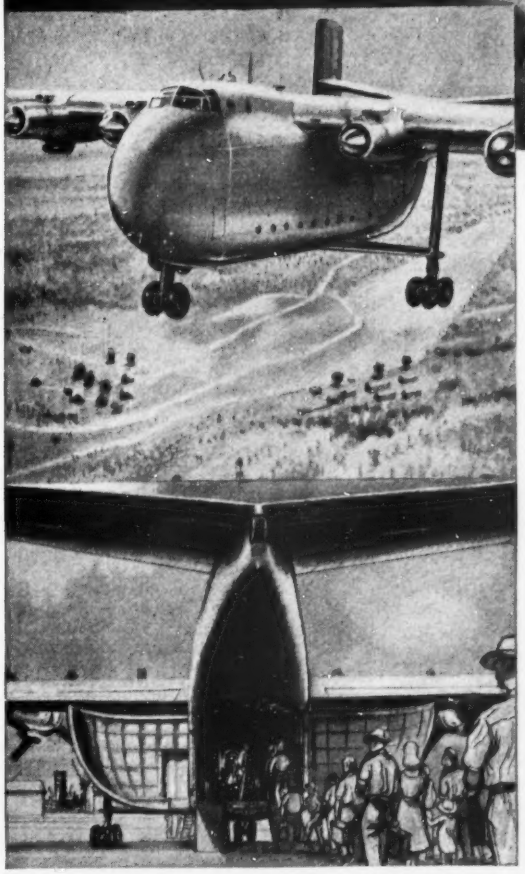
In this case, the important passengers concerned were one member of the Royal Family, a field marshal and two generals. The Valettas were taking members of a R.Aux.A.F. fighter control unit to Germany for their annual camp. The ferrying missions shown, while typical of the routine tasks performed by the Overseas Ferry Unit, are not fully representative; a few days previously members of the O.F.U. had completed delivery of a large batch of Sabres from Montreal. Delivery of between 300 and 400 of these Canadair-built fighters is currently the unit's major responsibility, and it is not widely appreciated that Transport Command pilots have been the first to handle large numbers of Sabres—the fastest aircraft in R.A.F. service. Thirty pilots recently accomplished a remarkable "double-shuttle," ferrying 60 Sabres from Canada to Britain in 11 days with the assistance of a Hastings (in which they flew west after completing each leg of the flight in order to pick up a second aircraft).

Members of the Command are extremely conscious of the importance of high aircraft utilization, although it is obviously impossible to achieve results comparable with those of commercial airlines. Many of the flights are non-scheduled, and planning of regular services is constantly disrupted at short notice. The fact that many of the crews are under training, and lack the necessary qualification for passenger flights, is another adverse factor. Nevertheless, Transport Command has rendered excellent service throughout the post-war years. In 1952 alone its aircraft flew nearly 4½ million statute miles, carrying some 27,000 passengers, 2,430 tons of freight and 500 tons of mail.

The Command's excellent safety record testifies to the efficiency of its crews and the high standards to which they operate. There has been no loss of life among passengers over the past four years. Together with the American Military Air Transport Service, Transport Command has pioneered the adoption of rearward-facing seats in passenger-carrying aircraft. The standard medium- and long-range aircraft employed by the Command—respectively, the Valetta and Hastings—are now well established in service. Pilots and crews find their performance excellent, but the lack of end-loading arrangements restricts their usefulness in the tactical rôle. The new Blackburn Beverley, for which orders have been placed, should go a long way towards making up this deficiency. In addition, the Beverley should provide a very welcome increase in capacity available on Transport Command's normal supply routes. The Beverley order, coupled with the announcement that Vickers-Armstrongs, Ltd., have been "authorized to start work" on the Vickers 1000 four-jet military transport, indicates that the Command's fleet will undergo a complete transformation within the next few years. Whatever the future brings, it is certain that Transport Command will continue to meet its increasingly important responsibilities with efficiency and enthusiasm.



Flights to freedom: Repatriated soldiers (right) from Korea complete their journey from Tokyo to Lyneham by Hastings Ambulance. Pictured below is the conclusion of a recent flight from Moscow to Abingdon via Berlin; marshaller's bats seem to welcome Hastings WJ 338 on return from the Soviet capital with liberated civilians from North Korea.



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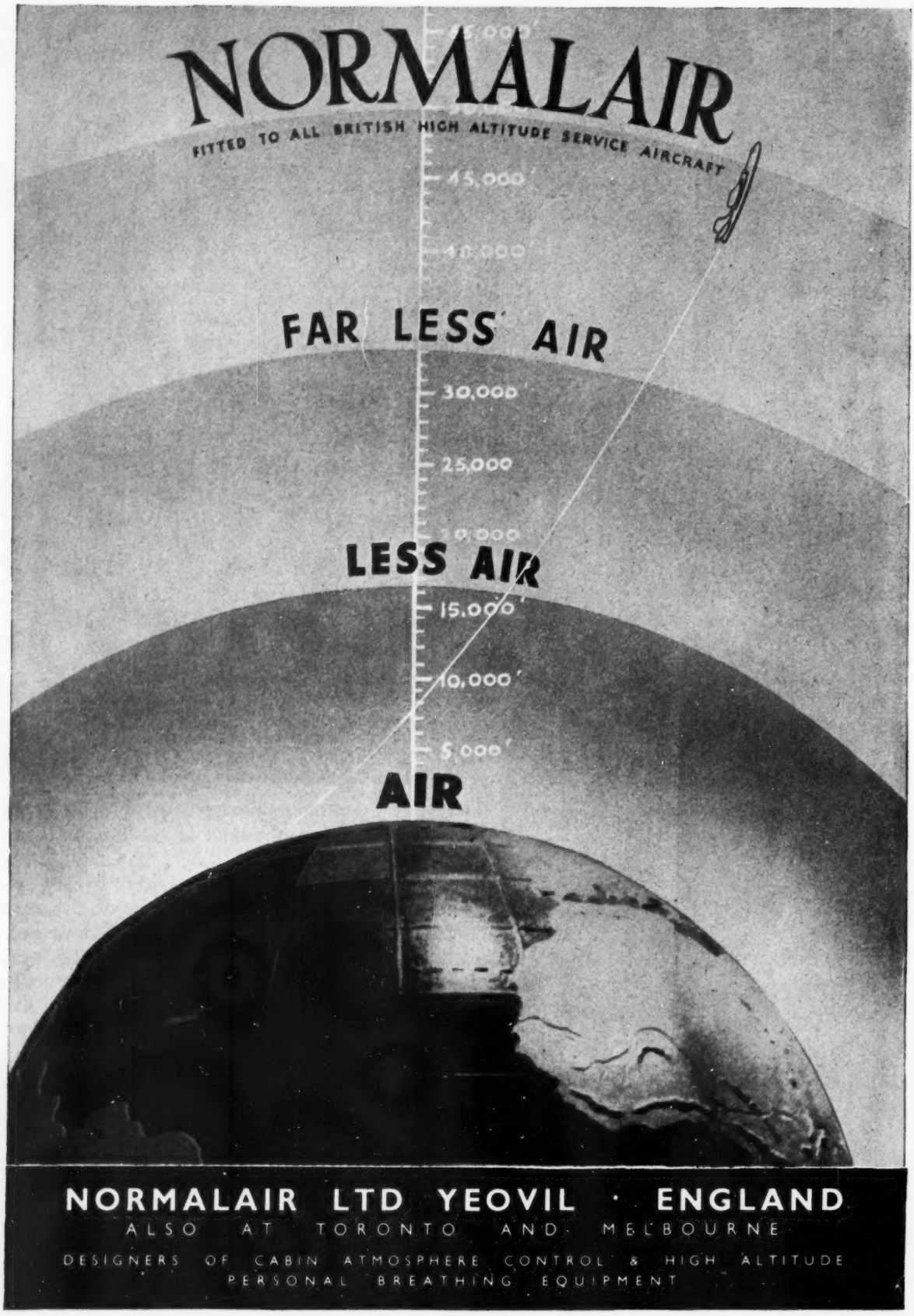
Universal

Blackburn and General Aircraft Limited, Brough, E. Yorks



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Modern instructional aids are essential to a Command such as Technical Training. The installation of demonstration rig for Meteor electrical equipment is here being checked.

THE QUEEN'S AIR FORCES . . .

TECHNICAL TRAINING COMMAND

THE cutting-edge of the sword that is the Royal Air Force lies in the quality of its modern operational aircraft and their highly trained crews. And yet for every man who flies in the R.A.F., between 30 and 40 men and women are needed on the ground—servicing crews, supply, equipment, administrative, medical, technical and other specialist personnel—forming the full weight behind the blade-edge. It is the task of Technical Training Command to train and prepare this weight.

In general terms, the rôle of the Command is to give initial training to all personnel entering the Royal Air Force, except aircrew and Cranwell cadets, and to give advanced technical training to officers and men to fit them for higher ranks and responsibilities.

The Command is organized into four Groups, each specializing in particular branches of training. No. 22 Group deals broadly with non-technical training; that is, with the reception and basic training of R.A.F. and W.R.A.F. recruits; training of administrative tradesmen such as clerks, supply personnel and batmen; and officer training, including instruction at O.C.T.U.s and courses in equipment, education and accountancy subjects. Engineering, including training of boy entrants and apprentices, is the concern of No. 24 Group. The Group specializes in basic and advanced technical training for engineering, armament, electrical and instrument tradesmen, cooks, photographers and P.T.I.s, and also in officer-training for catering and ground defence.

Radio and radar mechanics, fitters and operators (including boy entrants and apprentices) are trained by No. 27 Group which, in addition to its signals courses, is responsible (under functional control of the Air Ministry) for R.A.F. Regiment courses, the C. of E. Chaplains' School, and the R.A.F. selection board.

The fourth unit of Group status is the Technical College at Henlow, which trains technical cadets and officers in the three constituent subjects of armament, engineering and signals, and includes in its duties similar functions to those which Cranwell performs for the General Duties and Equipment and Secretarial branches. The College also provides conversion and familiarization courses for serving officers, and is responsible for the servicing of the Command's aircraft.

A recent and interesting innovation has been the introduction of the University cadetship scheme for candidates for permanent commissions in the technical branch. Previously, such candidates entered either as University graduates (then receiving specialist courses) or as skilled engineers from the ranks. The new scheme, started last September, takes in boys at school-leaving age on the results of a competitive examination. It gives them a year at Henlow, followed by a three-year University course (most will go to Cambridge) as commissioned officers, during which time they may train as pilots in the University Air Squadron. Final Service training will be given at Henlow. The aim of the scheme—which has begun well—is to supply highly qualified officers for the more advanced, interesting and highly skilled tasks in the technical branch. The scheme is proving extremely popular and should fill an important need in the Service.

In all aspects of the Command's work, and especially in the basic training of young airmen, much emphasis is placed on character-training, in addition to mere technical instruction. Physical training, discussion groups on citizenship and world affairs, spare-time hobbies and further training, and "padres' hours" all help to give a balanced and healthy outlook and (in the widest sense of the word) education. An improved quality of men selected for drill-instructor duties, who can have such an important effect on the newly-joined airmen, has also assisted in producing well-balanced—as well as highly trained—people. The "housemaster" system, similar to that of a public school, has been introduced in the training of recruits and apprentices to help in solving the problems in training boys of a wide range of ages. To maintain the high standard of training in the specialist courses, instructors perform teaching duties and "on the job" work alternately, ensuring that they remain up-to-date in their technical knowledge.

For various reasons, the progressive training policy required by the introduction of the new trades structure is difficult to fulfil, the main problem being a shortage of the more highly skilled tradesmen. Temporary measures taken by Technical Training Command to remedy this situation include several schemes for the short-circuiting of the normal training path if the personnel concerned can benefit from immediate advanced training. But in the long run a steady supply of competent and interested long-service airmen is the only satisfactory solution.

In the face of changing conditions outside its control, Technical Training Command, under its A.O.C-in-C., Air Marshal Sir Victor E. Groom, K.B.E., C.B., D.F.C., is effectively performing a vital and unpublicized job. It is also a complicated job, involving over 4,000 instructors and dealing with over 1,000 trainees each week. And yet this vast machine is a machine dealing with individuals. The efforts of all its personnel—its instructors, teachers, administrators, research staff and others—are so directed that the mutual confidence existing between the men who fly and their colleagues on the ground shall continue in the future. It is indeed a worthwhile task.

MAINTENANCE COMMAND

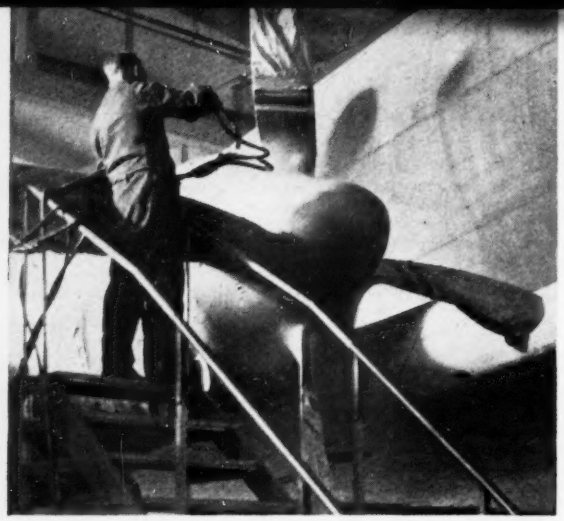
THE motto of Maintenance Command is "Service." Thus summarized is the Command's main rôle: to serve and provide every material thing needed by other Commands and units, both at home and overseas. Providing the right thing at the right place at the right time—and in the right condition—is an onerous task, but an extremely important one, for if Maintenance Command failed in this duty, other Commands might be grounded as a direct result.

Structure of the Command—the present A.O.C-in-C. of which is Air Marshal L. G. Harvey, C.B.E.—remains unchanged in broad outline since its formation in 1938, but there have been detail developments in the four-group organization. Dealing first with the supply of complete aircraft: this is the responsibility of No. 41 Group which handles the reception, storage, and distribution of aircraft, and their fitting-out to the operational standard for the envisaged duty. Aircraft modifications are also made, disposal of redundant aircraft is effected, and complete aircraft are prepared for despatch to overseas units.

The reception, storage and distribution of explosives and compressed gases, together with the supervision of fuel distribution and storage (largely performed under contract by the petroleum companies) is the concern of No. 42 Group. Safety restrictions for the storage of explosives in peacetime demand a more detailed supervision, especially as stocks are not regularly used up and replaced as in war. The disposal of explosive stocks which are no longer required—by breaking down and recovery of materials, by dumping or by demolition—is a continuous process, and one of the tasks of No. 42 Group.

The job of No. 40 Group is to receive, store, distribute and maintain in storage all categories of equipment other than complete aircraft and explosives. Some degree of dispersal of stocks is

Transport of aircraft is one aspect of the work of Maintenance Command. Here, a Vampire is seen dismantled and mounted on a "long low-loader."



Storage is another important job. A Hastings aircraft is being partially cocooned for long-term storage at one of the Command's depots.

The Queen's Air Forces . . .

maintained for reasons of strategic security, and from these several holdings distribution to home and overseas Commands is made, and commitments to Allied and Commonwealth air forces are met.

The work of the remaining Group, No. 43, is divided into two parts. Firstly, it arranges for the repair on site and the salvage and transportation of damaged aircraft to the contractors, and secondly it plans and carries out the programmes of work at the repair depots (mainly for productive purposes, but also as a means of training personnel and developing repair techniques in the Service). Maintenance Command pilots attached to 41 and 43 Groups flight-test aircraft on issue or after repair, and collect and deliver them from manufacturers to home units.

The Command employs a large number of civilian staff, amounting to some 60 per cent of the total strength. By employing civilians, Service manpower is saved and greater continuity is obtained in routine work, with consequent increase in efficiency. Overall numbers in the Command have stabilized following the immediate post-war decrease in activity.

As previously mentioned, responsibility for salvage and repair of damaged aircraft is one of the Command's duties, actual repair work being carried out either by 43 Group itself, or by the appropriate manufacturing firm. After deciding whether a damaged aircraft is to be repaired on site, repaired by the makers, broken up for spares or scrapped, 43 Group make the appropriate arrangements for its transport or repair.

Wherever extensive storage of a wide variety of components has to be performed, the use of mechanical handling and other modern aids can be very important, and Maintenance Command is no exception. Improved electric fork-lift trucks with increased manœuvrability, improved types of storage pallets, and improved types of racking are all under development for 40 Group, as is the "mezzanine floor" concept for combined bulk and batch storage. In 41 Group, new aircraft handlers are undergoing trials and the outside development of new trucks, cranes and other labour-saving equipment is followed with interest by all branches of the Command.

A streamlining of the radio equipment repair system has recently been introduced, and involves the direct exchange of "new sets for old" from special Maintenance Command vehicles which visit the operational stations in turn. By cutting down the transportation time, and transportation damage, this system has resulted in a markedly improved serviceability in the operational Commands. A similar scheme, with transport by air, is used to serve units in 2nd T.A.F.

Some idea of the scale of the Command's work may be obtained from recent totals referring to one month's activity : over 40,000 tons of material were handled, while in 41 Group some 500 aircraft movements took place. A glance at the detailed statistics of work done by Maintenance Command verifies further the suitability of their motto. Their job is "service"—routine background service, without the glamour of the operational Commands, but with the responsibility of providing the material lifeblood for the whole of the R.A.F.

R.A.F. REGIMENT

IN February last year the R.A.F. Regiment celebrated its tenth anniversary. Over these years, and continuing today, the record is one of firm achievement in which officers and men have performed an effective job in many parts of the world. The object is that the Royal Air Force should be able to fight on and from the ground, as well as in the air.

At the beginning of the last war, the defence of air bases was regarded as an Army responsibility. The rapid invasion of the Low Countries, and reverses in Greece and Crete, however, emphasized drastically that the R.A.F. would have to be capable of protecting its own airfields and installations. It was therefore decided in 1941 that an "airfield defence corps" should be built up, and the following year saw the formation of this new arm of the R.A.F., known as the Royal Air Force Regiment. Since then, its squadrons have seen service in the Middle East, North Africa, Italy, France, Germany and South-East Asia, while at home the Regiment's light anti-aircraft squadrons took some share in the defeat of the flying bomb.

Today, the broad function of the Regiment, under its Commandant-General, A.V-M. Sir Francis J. W. Mellersh, K.B.E., A.F.C., M.A., is threefold. Firstly, it provides light anti-aircraft defences at the major R.A.F. stations overseas, except those which lie inside Army anti-aircraft defended areas. Secondly, it provides full-time ground fighting units to augment station personnel in the defence of more vulnerable stations, and thirdly it provides a field from which staff and instructors can be selected to aid and advise the R.A.F. in ground-defence

The Regiment's armoured-car squadrons are to be replaced by field squadrons equipped with Land Rovers. Here both types of vehicles are seen operating together.

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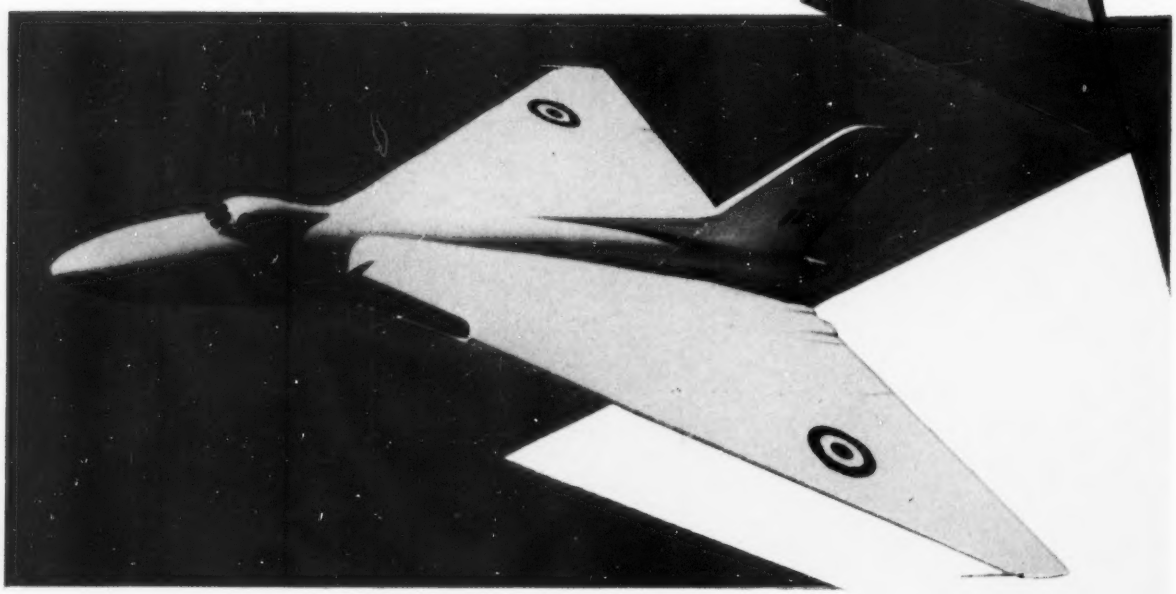

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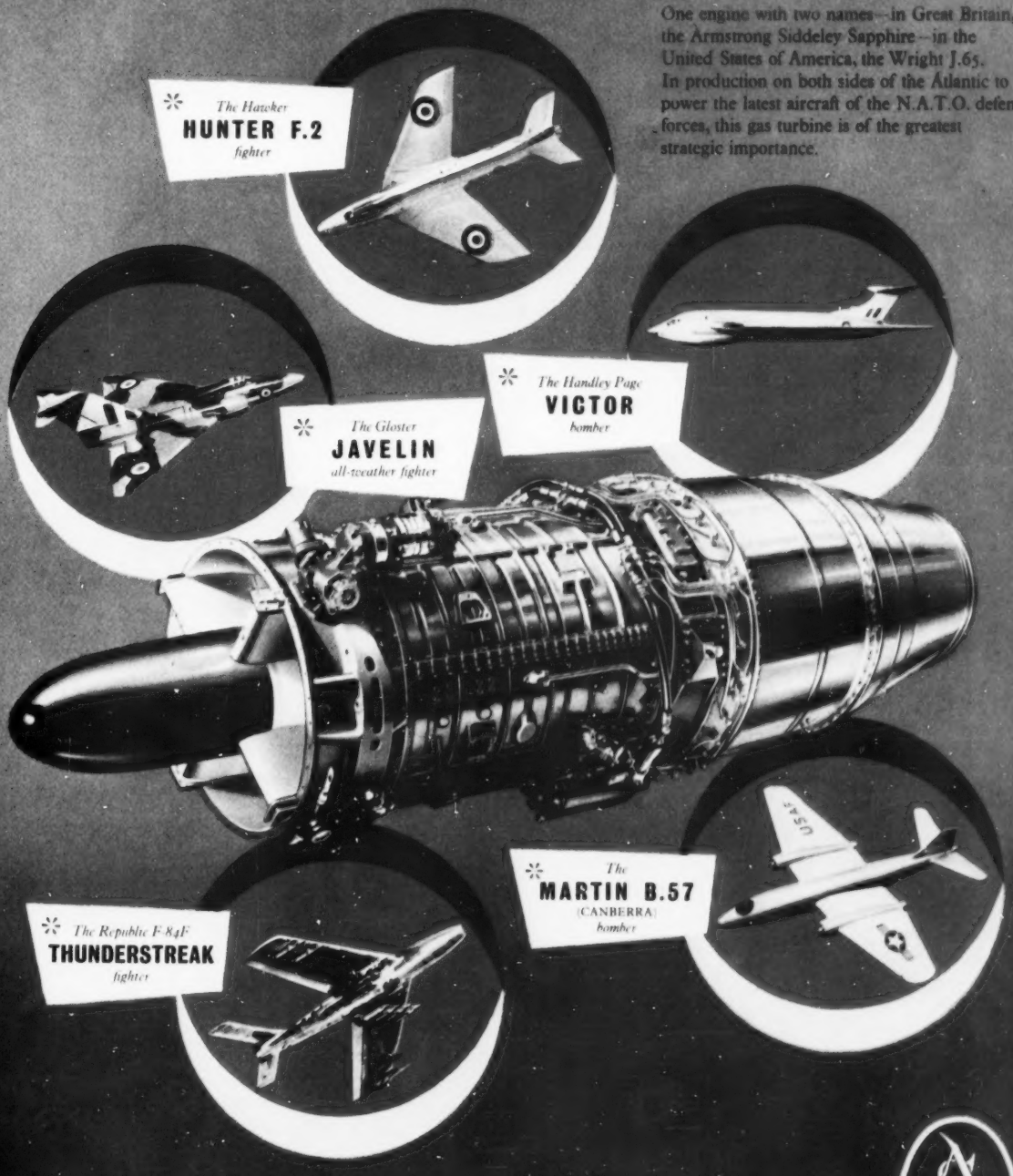

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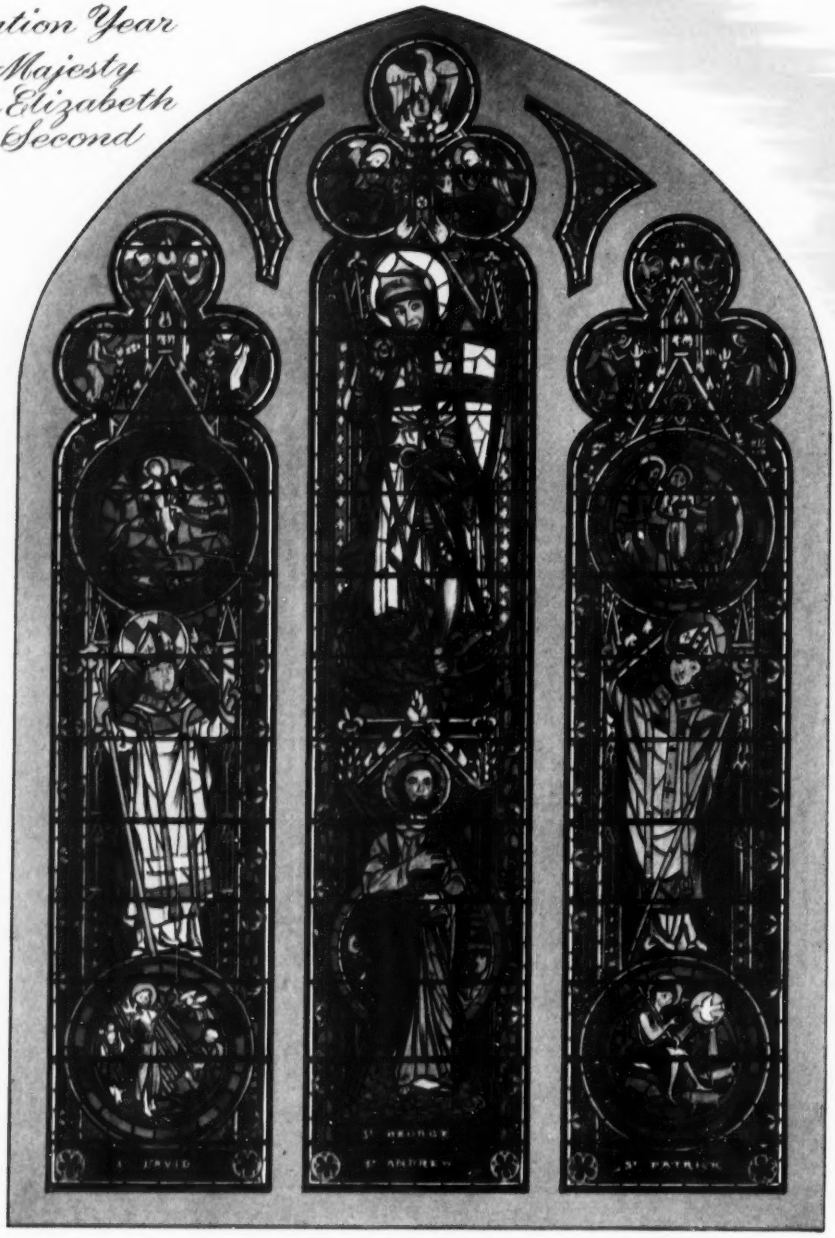

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Malaya is one of the countries where units of the Regiment serve. The photograph was taken at the headquarters of No. 91 Squadron at Rawang Selangor.

The Queen's Air Forces . . .

training and ground operations.

It is expected that a re-organization of the Regiment will shortly be made, reducing the types of operational unit to two: light anti-aircraft and field units. The former will form a light anti-aircraft wing of two or more squadrons, with administrative staff, and control, reporting and observation elements included at headquarters. The field squadrons will replace existing armoured car and rifle squadrons; they will be equipped with light, fast vehicles (of Land Rover type) and will be capable of performing reconnaissance, support and counter-attack duties.

A large number of Regiment officers and N.C.O.s are required for staff and instructional duties throughout the R.A.F. At the Air Ministry, there is a Directorate of Ground Defence responsible for policy and plans, and at all staff levels throughout the chain of Command the Regiment is represented. The provision of instructors at R.A.F. schools and colleges, and on stations, is another important commitment, and the Regiment also provides the officers and N.C.O.s for locally enlisted ground defence forces in Iraq, Aden and Malaya. The active-service conditions frequently encountered in these last theatres not only afford valuable experience but make duty with these forces very popular with keen young men. There are Regiment units in the Royal Auxiliary Air Force, and some Regiment officers in the R.A.F.V.R.

A recent well-deserved honour was the presentation of the Queen's Colour to the Regiment. In the presence of H.R.H. the Duke of Edinburgh and a distinguished company of guests, a detachment representing the Regiment received the Colour from H.M. the Queen at Buckingham Palace on March 17th this year.

THE WOMEN'S ROYAL AIR FORCE

THE work of the Queen's air forces is essentially a job for both men and women. The ubiquity and importance of the rôle of the Women's Royal Air Force is easily overlooked, and yet the fact remains that women serve in every one of the R.A.F. Commands described elsewhere in this issue, with the exception only of the R.A.F. Regiment. The W.R.A.F. in 1953 forms not a separate corps but an integral, essential part of the whole Air Force framework, and as such its value is undisputed.

The W.R.A.F. was first formed on April 1st, 1918, when the R.A.F. was constituted as a separate Service. By the time the women's element was disbanded in 1920, over 30,000 officers and airwomen had served in it. Its successor, the Women's Auxiliary Air Force, was formed in June, 1939, and numbered some 2,000 on the outbreak of war. Expanded to a strength of fifteen times that figure, the force in 1941 became part of the armed forces of the Crown, its officers holding His Majesty's Commission. Further expansion to the 1943 peak strength of 182,000 saw members of the W.A.A.F. serving in 83 different trades, including those most highly skilled. The excellent wartime record of the force need not be retold here.

From the experience of two world wars, it was seen that, to build up quickly and effectively a women's element of the Service in emergency, its administrative structure should not be allowed to disappear in times of peace. The decision was, therefore, made in 1946, to continue the women's forces on a voluntary basis as a permanent feature of the armed forces—but not as separate entities. The trend towards greater integration of the W.R.A.F. with the R.A.F. was carried to its logical conclusion, and since February 1949, when the force re-adopted the title "Women's Royal Air Force," women have enlisted in and been commissioned in the Service under substantially the same terms as the men.

Since the introduction of the new R.A.F. trade structure, opportunities for advancement in specialized trades have increased, and many members of the W.R.A.F. have taken Service examinations. They are also eligible to obtain the qualifications of recognized civilian bodies such as those concerned with nursing.

It is, of course, possible for W.R.A.F. members now to achieve the highest specialized ranks open to airmen, and even at the chief technicians' level the W.R.A.F. is represented. These improved prospects have resulted in an increase in numbers serving from 8,800 in 1951 to 9,900 at present, in spite of the high wastage rate due to marriage. Other recent incentives which have doubtless favourably influenced the number of recruits are the improved hat design, the issue of nylons, and the provision of more comfortable and modern barrack blocks.

In the 18 R.A.F. trade groups which are open to women (out of a total of 22) there are over 150 separate trades in the assistant, skilled and advanced levels. Fighter plotter and radar operator are two of the more interesting skilled trades, open to candidates who can satisfy the intelligence and aptitude requirements on entry. Commissions may be obtained in the technical, equipment, secretarial, fighter control, medical, dental, education, provost and catering branches—both from the ranks and in some cases by direct entry—and in addition, officers and airwomen are able to serve in the Auxiliary and Reserve Services.

A recent development at the Universities of Oxford and London has been the formation of auxiliary ground fighter control flights, attached to the University Air Squadrons, in which Auxiliary or Reserve women can serve. It is hoped to extend this scheme to other Universities later. One regular section which University women may enter directly is the technical branch, for engineering or signals duties.

Both at home and abroad the women of the W.R.A.F. continue to play their essential part in the work of all branches of the R.A.F. As their Director, Air Commandant Nancy M. Salmon, O.B.E., forecast in a message to *Flight* three years ago, they are "sharing fully in the task of maintaining a strong and efficient Service—and thus, in a wider sphere, making their own contribution towards the preservation of world peace."

Members of the W.R.A.F. work together with the men in most branches of the Service. Here, the work of fighter plotters is shown.

R.C.A.F. North Stars loading and refuelling at Resolute Bay, in the North West Territory.

THE QUEEN'S AIR FORCES . . .

THE COMMONWEALTH

IN this year of 1953, the countries of the British Commonwealth of Nations possess more and larger air arms than ever before during peace-time. The purpose of the review that follows is to outline the origins, histories and current activities of these Air Forces, special attention being given to the rôles which they are playing today in the strengthening of the defence forces of the free world.

Royal Canadian Air Force

DURING the First World War some 22,000 Canadians served in the R.F.C. and the R.N.A.S.; many decorations were won, and 1,563 men gave their lives. The first two squadrons of the Canadian Air Force, however, were not formed until just after the Armistice, and they were disbanded again in England in 1920. In that same year the C.A.F. was re-formed in Canada, and a training programme was put in hand.

In 1923 the prefix "Royal" was granted, by which time there were about 45 officers and 195 airmen on strength. At the outbreak of the Second World War there were 298 officers and 2,750 airmen in the Regular force, with about one-third that number in the Auxiliary units. Of 270 aircraft, only a few—Oxfords, Hurricanes, and Battles—were up-to-date.

During the war, very large numbers of Canadians served both with their own Air Force and in squadrons of the R.A.F. Peak expansion of the R.C.A.F. was reached at the end of 1943, by which time there were 215,200 personnel and 78 squadrons. Canada also played a dominating part in the Empire Air Training Scheme. Between April 1940 and March 1945, no fewer than 131,553 aircrew, including 49,808 pilots, were trained on 231 sites by a total of over 104,000 instructional staff. The scheme was a triumph of organization, and played a decisive part in the provision of Allied aircrew.

At the end of the war in Europe, the majority of R.C.A.F. squadrons were disbanded and personnel serving in R.A.F. units were withdrawn, but at the same time, plans were made to contribute eight heavy bomber squadrons to "Tiger force" for participation in the Japanese campaign. Hostilities ended, however, before the operations could be put into effect. More than 17,000 men of the R.C.A.F. had lost their lives during the struggle.

By the end of 1945 the total strength of the Service had been reduced from 181,235 to 58,047: further reductions took place more gradually, and in 1946 the post-war plan for the force was announced. There were to be 16,100 regulars, together with auxiliary and reserve personnel totalling some 14,500. The deterioration in the international situation during the past few years, however, has created the need for a much larger peace-time Air Force, and regular strength now stands at more than 37,000. Chief of the Air Staff is Air Marshal C. R. Slemon, C.B., C.B.E.

The main emphasis in the re-equipment of the R.C.A.F. today is being placed on the formation of new fighter squadrons, 41 of which are planned for the regular and reserve forces. The aircraft to equip these units are the F-86 Sabre and the CF-100, both of which are being built in Canada, the former by Canadair, Ltd., and the latter by its designers, A. V. Roe (Canada) Ltd. The latter firm are also building the Orenda engines which power the CF-100. A chain of radar stations is being built up at the same time as the fighter force.

R.C.A.F. fighter squadrons are making a notable contribution to NATO defence. A wing of three, Nos. 410, 441 and 439, is stationed at North Luffenham; a second wing, comprising Nos. 421, 430 and 416 Squadrons, is in being at Gros Tenquin, in France; and a third, consisting of Nos. 413, 427 and 434 Squadrons, has recently arrived at Zweibrücken, in Germany. A fourth wing is scheduled to be based at Solingen, Germany, in the near future.

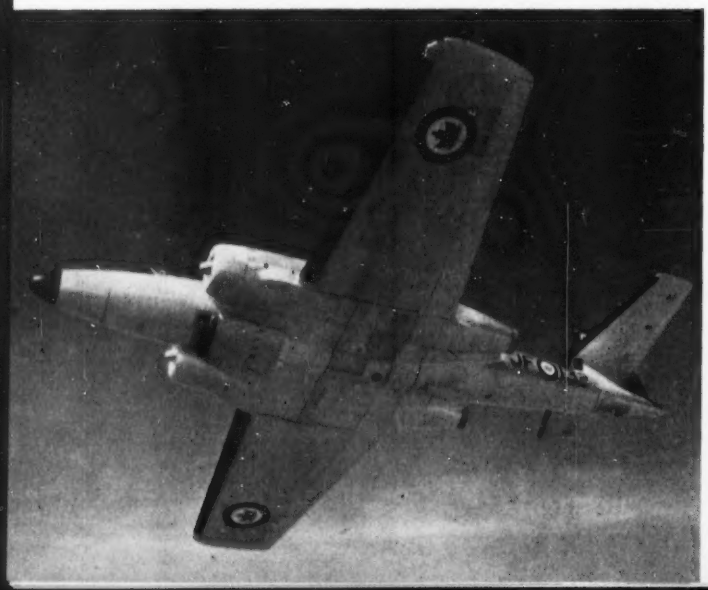
No bomber force is projected at the present time, but there are maritime squadrons—equipped with Lancasters—and transport squadrons. Most of these latter operate Dakotas and Packets within the Dominion, but one of them, No. 426, has been flying North Stars on an airlift to Korea since July 1950, during which time over 400 round trips have been made, and 10,000 personnel and more than five million pounds of freight have been carried. The squadron also operates transatlantic services.

Parties of servicing personnel are stationed along the route to Korea, which normally runs from Dorval *via* Tacoma in Washington, Alaska, Shemya in the Aleutians, and Tokyo to Korea. An alternative tropical return route passes through Wake, Iwo Jima, Hawaii and San Francisco.

Pilot training is at present carried out solely on Canadian-built Harvards, but the T-33 (two-seat Shooting Star) jet trainer will also be used. After receiving their wings, pilots graduate to squadrons *via* A.F.S. and O.T.U.—and, if applicable, a gunnery

(Left) An unusually revealing view of a CF-100: Points of particular interest include the radar nose, the armament pack, the intake on the port wing-tip, and the fairings between nacelles and outer wings. (Right) R.C.A.F. Sabres in tight formation near North Luffenham.

"Flight" photograph



TRAINING ECONOMIES

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training school—in the same way as in the R.A.F. Reserve training, also a feature of the current programme, includes an interesting "Chipmunk scheme" by which up to 600 veteran pilots are being given refresher flying and ground training. The R.C.A.F. supplies the Canadian-built Chipmunks and the money; flying clubs provide the actual instruction. Other training schemes include courses for university students (giving instruction up to wings standard for pilots and to a comparable level for other aircrew and groundcrew) and a very close liaison with the Air Cadet League of Canada, which has a membership of over 22,000 cadets. Furthermore, since July 1951, women have been eligible to serve in the R.C.A.F., and several thousand have now joined. In contrast to the members of our W.R.A.F., they fit into the general personnel-pattern, and there is no special women's corps.

A scheme has recently been introduced whereby aircrew from various NATO nations are trained in Canada. The first trainees arrived in late 1950, and about 1,400 are now being turned out annually, making the total present aircrew training commitment approximately 3,000 per annum.

Apart from the usual activities of any air force, the R.C.A.F. performs duties of a more peaceful nature. Largest of these in terms of strength involved has been the aerial photographic coverage of Canada, carried out by the Lancasters and Dakotas of the Air Transport Command photographic squadrons based at Rockcliffe, near Ottawa.

Another valuable responsibility is the R.C.A.F.'s search and rescue organization. The primary object is to fulfil the Dominion's I.C.A.O. commitment, whereby an organization must exist capable of rendering aid to aircraft in distress on the east and west coasts. The scope of the organization has been increased—as a purely domestic arrangement—so as to help aircraft in inland areas, and frequently—where a matter of life and death is involved—crews are dispatched on errands which are not concerned with aircraft at all. A number of doctors, medical orderlies and nurses have been trained to make parachute drops to injured persons.

In conclusion, further regular tasks are the flying of aircraft into the arctic conditions of the far north and the maintenance of the Winter Experimental Establishment.

Royal Australian Air Force

THE first Australian air unit was formed in 1912, when a Central Flying School was established, at Point Cook, with two officers and 50 other ranks. In 1915 the unit was mobilized and sent to Mesopotamia. The following year a squadron left for service in Egypt and Palestine, and by the end of the war three other squadrons were operating in France, backed by a training wing in England. When the Armistice was signed, the entire Air Force was disbanded. Australia had been the only Dominion with her own Air Force : total strength had been about 3,000 men, including 259 pilots, and these between them had destroyed over 400 enemy aircraft. There were 260 casualties, 144 of them fatal.

In March 1921, the Force was re-created, utilizing more than 100 aircraft presented by Great Britain as well as a number already available in Australia. Later in the same year the title of Royal Australian Air Force was conferred. A gradual expansion took place, and by 1937 eight squadrons existed, equipped with Wapitis, Bulldogs, and Demons. In the following year orders were given to replace these aircraft by Ansons, Battles and Hudsons, and Australian manufacture of Wirraways (basically Harvards) and Beauforts began.

After war was declared, Australia became a major participant in the great Empire Air Training Scheme. Her commitment was to train seven-ninths of her own personnel, the remainder being sent to Canada for instruction. Tiger Moths, Ansons and Wirraways were used and, later, O.T.U.s were set up. In all, 37,087 aircrew Australians were turned out under the scheme, some of whom served in the R.A.F. and others in R.A.A.F. squadrons. They were in action both in the European theatre and in the Far East. The total number of casualties was 13,988; of these, 10,939 lost their lives. Since the war, Australia has preserved a modern force of considerable size. The total number of regular officers and men employed will soon be 16,000, and to these must be added some 5,000 National Servicemen. Chief of the Air Staff is Air Marshal Sir Donald Hardman, K.C.B., O.B.E., D.F.C. Senior Australian officers are A.V-Ms. J. E. Hewitt, C.B.E., and F. M. Bladin, C.B., C.B.E.

Meteors of No. 77 Squadron, R.A.A.F., over typical Korean scenery.

Future fighter equipment will be Australian-built Avon-Sabres, the first of which are already under construction; but at the present time squadrons are using Australian Nene-Vampires and a few remaining Mustangs. The two squadrons serving in Malta have English Vampires.

One Australian fighter squadron not equipped with Vampires is the famous No. 77, which has been in operation in Korea since 1950 on air-to-ground fighting and escort work. For a year from July 1950, Mustangs were used, then Meteor 8s were acquired. The squadron was the first non-American or non-Korean unit to take part in the fighting. The tour for pilots is 6-9 months, that for ground personnel naturally rather longer.

Turning now to larger aircraft, bomber squadrons have until recently been equipped with Australian-built Lincolns, and one such unit is at present serving in Malaya (a description of a bandit strike in a R.A.A.F. Lincoln is given on page 667 of this issue). Avon-engined Canberras, however, are being built in Australia, and re-equipment with this type is about to begin. For coastal work, Lincolns and Neptunes are used, and transport duties are undertaken by Dakota squadrons, one of which is at present stationed in Japan, whilst another recently completed a tour in Malaya. R.A.F. exchange personnel are serving with some of the Dakota units based in New South Wales. At Mallala, in South Australia, is a squadron equipped with Bristol Freighters and Percival Princes as well as Dakotas, and their aircraft are used for the bulk of the services between Adelaide, Melbourne and the Woomera rocket range.

Training for pilots has, until recently, been on Tiger Moths and Wirraways, but two-seat Vampires are now being introduced. For the moment, at any rate, these aircraft will constitute a third stage, and will not be a replacement for Wirraways. It is intended to replace the Tiger Moths, and to this end the Australian-designed C.A. 22 Winjeel has recently been put into production.

Royal New Zealand Air Force

THE beginnings of an Air Force in New Zealand occurred in 1923, when a small air arm, under the supreme control of the Army, was formed at Wigram. In 1934 the title of Royal New Zealand Air Force was granted, but by early 1936 the total regular force still comprised only 20 officers and 107 men; additionally, however, there was a Territorial Air Force corresponding to our Auxiliary Force.

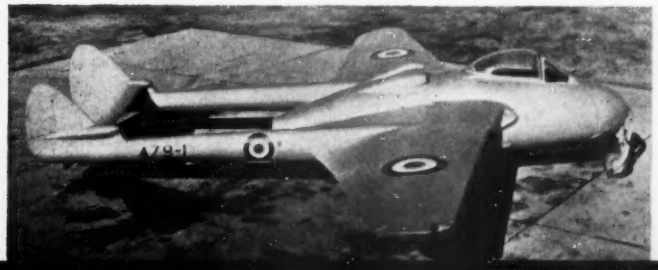
In late 1936, when the international situation was already deteriorating, W/C. the Hon. R. A. Cochrane (lately, as Air Chief Marshal Sir Ralph Cochrane, V.C.A.S. of the R.A.F.) made a tour of the existing units and subsequently submitted a report which led to the passing of the Air Force Act on April 1st, 1937, thus authorizing the R.N.Z.A.F. as a separate force. He became first C.A.S. of the new Service, with the rank of group captain, and the R.N.Z.A.F. still owes much to his organizing ability.

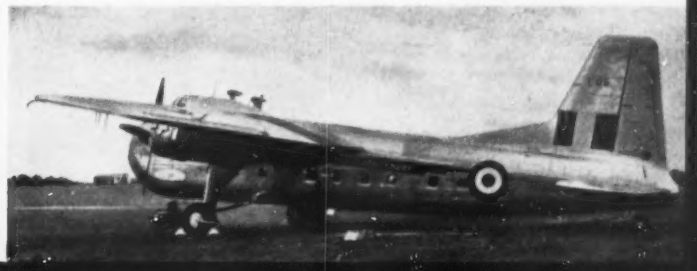
A training programme was put in hand, to produce pilots for the R.A.F. rather than for the R.N.Z.A.F., owing to the darkening political situation in Europe. By September 1939, some 300 pilots had been so trained. When war was declared, the Empire Air Training Scheme came into effect, and a large number of pilots were subsequently trained in New Zealand.

During the war, six R.N.Z.A.F. squadrons were formed to operate with the R.A.F. in Europe. These units did magnificent work, but New Zealand's greatest contribution was undoubtedly

The first Australian Nene-Vampire: Note the intakes for supplying air to the rear of the compressor. (Right) a Bristol Freighter of the R.N.Z.A.F.

"Flight" photographs





An R.N.Z.A.F. Hastings, similar to the one entered for the forthcoming London-Christchurch (N.Z.) Air Race.

The first two of ten Devons equipped as signals and navigation trainers and ordered by the R.N.Z.A.F.

The Queen's Air Forces . . .

in providing aircrew for attachment to the R.A.F. The total number, mostly aircrew, who became involved in the European war was approximately 11,000; 3,200 of them gave their lives.

In the Pacific, after Pearl Harbour, training was increased to a very large extent, and squadrons operating all classes of aircraft were formed both for the defence of the home islands and for offensive action in the various campaigns of the Japanese war. About 25,000 men were involved in these operations.

Since the war, about 300 New Zealanders have remained with the R.A.F., but a major effort has also been made to maintain a small though thoroughly up-to-date Air Force in New Zealand. There is a compulsory military training scheme in that country now, and those who elect to become pilots during their period of service undergo initial training on Tiger Moths, and then pass on to the Territorial Air Force. Selected National Servicemen, however, are taken to form the intake for the Regular Air Force, and they then continue training on both Harvards and Oxfords, regardless of the class of aircraft they will eventually fly in squadron service. The Oxfords are now being replaced by Devons.

As far as squadrons are concerned, the R.N.Z.A.F. operates no bombers at the present time, having just disbanded their Mosquito units. There are two fighter squadrons equipped with Vampires, one now serving in Cyprus and the other at home : the training of pilots for these units is carried out at an A.F.S. run on similar lines to those of the R.A.F., two-seat Vampire Trainers being employed. There is a Transport Squadron, which operates Bristol Freighters and Hastings. The latter aircraft are used to run a monthly service to the United Kingdom, and one of them has been entered in the handicap section of the forthcoming London-Christchurch Air Race.

Finally, there is a flying-boat squadron. Catalinas have been employed until recently, but now the unit is re-equipping with fully-reconditioned and refitted Sunderlands.

In parallel with the regular force, as already mentioned, is the Territorial Air Force, comprising five squadrons. There are Harvard units based on the outskirts of each of the four main cities, Auckland, Wellington, Christchurch and Dunedin—and also a Catalina squadron, which will shortly be converted to Sunderlands. This last squadron is in fact manned partly by Regulars.

Headquarters of the R.N.Z.A.F. are at Wellington, and the present Chief of the Air Staff is an R.A.F. officer, A.V-M. D. V. Carnegie, C.B., C.B.E., A.F.C. Senior New Zealand officer is A. Cdre. S. A. Wallingford, C.B., C.B.E., A.O.C. Task Force H.Q.

South African Air Force

A SOUTH AFRICAN Aviation Corps was formed in 1913, and its personnel were drafted to R.F.C. squadrons serving in France shortly after the outbreak of war in the following year. In 1915 the Corps was re-established in South Africa, where it operated successfully throughout the South-West African campaign. Later on, it became No. 26 South African Squadron, R.F.C., and, after a period of intensive training in England saw further service in the East African campaign, where General Smuts' men were opposing the Germans.

The South African Air Force proper was formed in 1920 with Colonel Pierre van Ryneveld as Director. The British Government provided a hundred aircraft to give the new force a flying start.

In 1936 a great expansion was planned, involving six Regular squadrons plus a further two from South African Airways, with a reserve of 1,000 pilots and 1,700 mechanics. The start of the second world war gave a spur to training, at the same time enabling the government to obtain modern aircraft from overseas and open numerous new airfields and other establishments.

By the end of the war the S.A.A.F. was a very considerable force with many gallant exploits to its credit in all the European theatres of war, though notably in support of the Eighth Army. Many South Africans also served as members of the R.A.F. during these years. In South Africa itself, the training organization turned out more than 16,000 personnel.

Since the war, an efficient force has been retained, Headquarters being at Pretoria and the Staff College at Waterkloof, some four miles distant. The Air Chief of Staff is Brig. H. G. Willmott, C.B.E. Fighter squadrons are equipped with Spitfires and Vampires, transportation is carried out with Dakotas, and the maritime squadrons use Sunderlands and Lockheed Venturas. Training is carried out on Tiger Moths, Harvards and Vampire Trainers.

Since September 1950, No. 2 Cheetah Squadron has been providing close support in Korea under the control of the U.S.A.F. The operational tour is 75 sorties. The squadron was originally equipped with Mustangs, and flew more than 10,000 sorties in two years : it is now being re-equipped with F-86s. During the period of Mustang operation 73 aircraft were lost, with 39 pilots.

A Mustang of No. 2 Cheetah Squadron, S.A.A.F. seen under typical winter conditions in Korea.

Royal Pakistan Air Force

THE Royal Pakistan Air Force came into being with the birth of Pakistan on August 15th, 1947. A division of existing military equipment was made between India and Pakistan, and the latter's share comprised the equipment of Nos. 5 and 9 fighter and No. 6 transport squadrons, together with that of an A.O.P. unit and a communications flight. To create an efficient air force, however, it was necessary to start virtually from scratch. The Spitfires, Tempests and Dakotas concerned were few in number and obsolescent, sufficient aircrew to man even these machines were not available, and the number of technical tradesmen was totally inadequate.

A flying training school was therefore established at Risalpur in September, 1947, and it has since become a college. Two ordinary schools, run on the lines of English public schools, have also been set up, to which boys from the age of 11 upwards are admitted. In the creation and operation of these latter establishments, the R.P.A.F. have been assisted by Air Service Training, Ltd., of Hamble. Future officers and technicians for the Service are

Vampires of the South African Air Force over Table Bay.

Seated in the cockpit of his Attacker, an officer of the R.P.A.F. awaits permission to taxi.

selected from the young students, and boys in other schools in the country are provided with the opportunity to join the Shaheen Air Training Corps, thus providing them with an entry into aeronautical activities. University air squadrons have also been organized, where flying training is given on Tiger Moths and Auster Aiglets. Training at Risalpur takes place on Harvards, and the full course lasts three years. Successful candidates pass on to Mauripur for conversion on to operational types of aircraft.

Technicians are trained at the R.P.A.F. Apprentices' Training School at Jorangi Creek (Karachi). This school, staffed by A.S.T. personnel, provides a three-year course on similar lines to that at Halton. In addition, as an interim measure, technicians are being directly recruited from civil life and given a shorter course before being sent to the squadrons.

Besides training its own personnel, Pakistan sends a considerable number of cadets to the United Kingdom, Australia and the United States, both for aircrew and for technical training, and some of them have won high awards during their stay.

In parallel with the setting up of the various training establishments, a successful effort has been made to re-equip squadrons with relatively modern aircraft. As intercepters, the R.P.A.F. are now using Attackers, whilst fighter/bomber squadrons are equipped with Furies. Bristol Freighters are employed for transport purposes, and Halifaxes have been acquired for use as heavy bombers.

Within its short span of existence, therefore, this very young Air Force has laid down a sound foundation for the future. General policy is to build up training establishments rather than to increase the number of squadrons, and now the R.P.A.F. is capable of expansion if the resources and requirements of the country so demand. Commander-in-Chief at the present time is A.V-M. L. W. Cannon, C.B., C.B.E., R.A.F., and the senior Pakistani officers are G/Cs. M. Rabb and H. Raza.

Southern Rhodesia Air Force

THE Southern Rhodesia Air Force was created in 1936, when two Territorial units were formed at Salisbury and Cranborne. In the following year S/L. G. A. Powell and F/L. V. E. Maxwell were seconded from the R.A.F., and gave valuable assistance in the formation and training of the new force. Tiger Moths were used for initial flying, and Hawker Harts for more advanced work when they became available.

Just before war was declared, the Territorial force of one complete squadron was put on a regular basis, and in September it was dispatched to Kenya. At this stage, the Rhodesian Air Force lost its identity for the remainder of the war, and the squadron—No. 1 Squadron S.R.A.F.—was re-numbered as No. 237 of the R.A.F.

In conformity with a general policy, only two other complete squadrons were formed, both of which saw service from England, but a large number of aircrew served in all commands of the Royal Air Force. Additionally, Rhodesia contributed to the Empire Air Training Scheme by providing the bases at which many more men were trained by R.A.F. instructional staff. An I.T.W., a gunnery school, and flying training schools (utilizing Tiger Moths, Oxfords and Harvards) were among the establishments formed.

A pleasing study of a Hawker Fury of the Royal Pakistan Air Force.

After the war, a small Army Co-operation Unit, consisting of communications and A.O.P. aircraft, was formed under the control of the Army. In 1950, the Rhodesian Government committed themselves to supply two fighter/bomber squadrons in the event of war, and an adequate number of Tiger Moths and Harvards were gathered together by various means, followed later by 20 Spitfire 22s supplied by the R.A.F. These aircraft constitute the equipment in use at the present time, but Vampires and Vampire Trainers have been ordered for re-equipment of the operational units, and it is hoped shortly also to replace the training aircraft with Provosts. Similarly, it is intended to replace the Rapides, Ansons and single Dakota of the communications squadron with Pembrokes, and in this way the greatest possible standardization will have been achieved—a policy which is particularly advantageous to a small air force. The commanding officer of the S.R.A.F. is Col. E. W. S. Jacklin, A.F.C.

Royal Ceylon Air Force

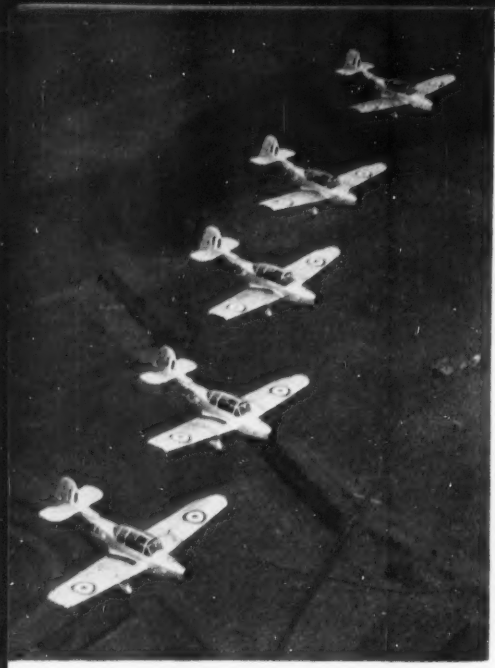
THE Royal Ceylon Air Force was created by the Air Force Act of 1949, but the task of moulding the new Service was not really started until the following year, when G/C. G. C. Bladon, R.A.F., arrived on the scene as air adviser to the Government. An initial training centre was then set up at Diyatalawa, together with a combined flying and technical training school at Katunayake. These new establishments were manned partly by Ceylonese personnel who had served with the R.A.F. during the war and partly by British personnel seconded from the R.A.F. itself. Prospective entrants for the Air Force were selected, some to be trained at the new training centres in Ceylon, and others to come to England for courses at Cranwell and Halton.

So far as aircraft were concerned, a dozen Chipmunks were obtained for training the new recruits, and these aircraft have now been giving good service for some time past. The first batch of Ceylon-trained pilots are ready for more advanced machines, and it is hoped that a number of Balliols will arrive in the near future, thus enabling progressive training to be continued. In the sphere of operational units, the present intention is to form two fighter squadrons. It has already been decided to obtain two-seat Vampires for A.F.S. work, and the squadrons themselves will be equipped either with Vampires or Meteors. A number of airfields other than Katunayake are, or can be made, available to operational units.

The commander of the Royal Ceylon Air Force is now G/C. Bladon, who transferred to the post when it was originally created. Senior Ceylonese officer is S/L. E. H. S. Amarasekera, D.F.C. and Bar, who had a distinguished record in Bomber Command.

Indian Air Force

THE Indian Air Force celebrated its twentieth anniversary on April 1st, and a full account of its history and present-day activities was given in *Flight* of April 17th. For this reason no further description is given now. Commander-in-Chief of the Force—which, although it does not owe allegiance to the Queen, maintains a very close liaison with the Royal Air Force—is Air Marshal G. E. Gibbs, C.I.E., C.B.E., M.C., R.A.F. The senior Indian officer is A.V-M. S. Mukerjee, O.B.E., who is at present attending a course at the Imperial Defence College in London.



Seen in the formation on the left, Percival Prentice basic trainers (Gipsy Queen 30)—built to a most difficult post-war specification—continue to give good service. Their successors, Provosts (Leonides) are more powerful and lively, as may be judged from the attitude of the one shown. Deliveries have just started.

THE QUEEN'S AIR FORCES . . .

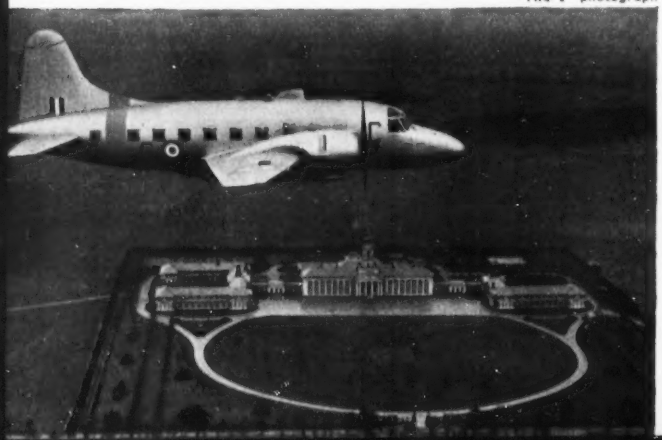
TRAINING COMMAND

A VERY great responsibility is carried by Flying Training Command of the R.A.F., for there is no doubt that the knowledge gained and the habits formed in the air and on the ground during the impressionable formative months of training have a lasting effect on a man's whole Service career. It is for this reason, too, that the staff and instructors at the various training establishments should be picked men, if necessary specially released from other duties, who will set the best possible example rather than—as has sometimes been the case in the past—second-best men who could be most easily spared from the operational squadrons.

Training Command has been in an almost continuous state of change and evolution during post-war years. It is, of course, one of the first to feel the effect of fluctuations in international relationships and military requirements—it has too frequently in the past been among the last, on priority, to receive new aircraft and equipment.

(Above) Balliols (Merlin), which now equip one of the F.T.S.s, are used in addition to and for the same work as the older Harvards in Training Command. (Below) Over the R.A.F. College, Cranwell, is seen a Varsity as used for advanced navigator and pilot training.

"Flight" photograph



Today the Command is well advanced in its plans to introduce a simplified and practical training syllabus to suit the "all-jet" Air Force although, in fact, a few piston-engined aircraft will probably remain in service for a long time to come. The type for pilot training will be the Percival Provost basic trainer with Alvis Leonides piston engine, and the D.H. Vampire T.11 with Goblin turbojet will be used for advanced training. All operational training in the pilots' syllabus is the responsibility of the Commands concerned. The separation of navigators at the applied flying stage—according to the squadron duties foreseen for them—and the commencement of functional training in Flying Training Command is a possibility in the future.

Within Flying Training Command there are for the time being four Groups:—No. 54, concerned chiefly with initial training and including Aircrew Selection Centre; No. 23, which is the F.T.S. Group and includes C.F.S.; No. 21 Group mainly concerned with aircrew training other than for pilots, but with the exception of a single Varsity-equipped advanced flying school for "heavy piston-engine" pilot training; and No. 25 Group, which has the jet Advanced Flying Schools. Each Group controls some dozen stations.

Pilot training in the Command today is in accordance, broadly, with the following scheme. Candidates enter the Aircrew Selection Centre at Hornchurch (as do all aircrew categories) and then proceed with a twelve-week Initial Training School course as aircrew cadets. On successful completion they become A.P/Os on probation, in time to start the course at their Flying Training School. The F.T.S. course is at present divided into 16 weeks of basic training on Prentices (or Chipmunks) and 32 weeks further training, including applied flying on Harvards (or Balliols). A "white" instrument rating is obtained at this stage. On obtaining his wings on piston-engine types, the new pilot under the present scheme has his commission confirmed and he moves on to his Advanced Flying School to fly Meteors or Vampires for 14 (short course) to 18 (long course) weeks, or perhaps Varsities for 10 weeks.

The short A.F.S. course is for those destined for day-fighter and ground-attack squadrons; the long course, which includes additional night and instrument flying, is for all-weather fighter and bomber pilots. The single Varsity A.F.S. is to meet Coastal and Transport Command requirements and, for a short time longer, those of Bomber Command's Lincoln squadrons. The next stage, operational training at the O.C.U., follows (as already mentioned) in the Command concerned.

Already the scheme and organization outlined above is being modified to suit the smaller, very selective intake for aircrew duties now ordered, and in preparation for the proposed new and simplified scheme entailing 30 weeks and 120 hr on Provosts followed by 30 weeks and at least 110 hr on Vampires. The first Provost course will probably begin in August. Meteor 7s will be replaced over a period by Vampire T.11s (5s and 9s being used for solo). Harvards and the few remaining Oxfords will then be retired. Piston-engined twin conversion will be done on Varsities. Wellingtons are no longer used in the Command. Jet Provosts do not yet enter the picture, although a small order has been placed. The first batch of eight piston Provosts delivered is undergoing intensive flying and servicing trials.

Navigators complete I.T.S. with the pilots in 12 weeks and

Meteor 7s have equipped the Advanced Training Schools for some time. Now they are starting to be replaced by Vampire T.11s illustrated below.

then go on to Air Navigation Schools. There, for ten months, they do basic flying in Ansons and in Valetta T.3 "class-rooms" (some Marathons are also to be added to the A.N.S. fleets), and applied navigation training on Varsities; fighter navigators are an exception, as they do the basic syllabus with additions, then pass on to Fighter Command for their A.I. and other training.

Signallers, after selection, do a 50-week course at their Air Signallers' School which includes I.T.S. Basic instruction in the air is given in Proctors or Prentices and advanced in Ansons.

Few new aircraft carry gunners, but at the Central Gunnery School at Leconfield there are various special courses for gunnery instructors, for signallers of Coastal Command—for pilot-attack instructors and so on. Meteors, Vampires and Lincolns are used—there are no longer any Spitfires or Tempests.

Embryo pilots and navigators receive as cadets further education (mathematics, English, etc.) and leadership training at I.T.S.

Some pilot training will continue to be carried out at Nos. 4 and 5 F.T.S., Rhodesia, for the next few months; then the Rhodesian Air Training Group will close down. Chipmunks and Harvards are used.

Some pilots and navigators also receive their F.T.S. course in Canada. For pilots, the Harvard is used right from *ab initio* stage to wings. The trainees cross to Canada after I.T.S. and return for acclimatization followed by A.F.S. Canada plans to introduce T-33 jet trainers (two-seat Shooting Stars with Nene turbojets).

Some special individual units and functions of Flying Training Command are as follows:—

The R.A.F. College, Cranwell.—Selected cadets receive a two-years eight-months special course of flying training and further education to fit them for permanent commissions in the R.A.F. On completion, and having obtained their wings and commission, they join other aircrew trainees at A.F.S. Cranwell is a subformation of F.T. Command and at present uses Chipmunks and Harvards.

Central Flying School.—At C.F.S. flying instructors courses are given on representative training aircraft of all types. Pilots carry out basic instructor training at South Cerney on Prentices before going to Little Rissington for applied training on more advanced types. At South Cerney also those who require it—for example pilots from Lincoln squadrons—are given a short refresher and instrument rating on Harvards before starting the C.F.S. course proper. C.F.S. is also the base of the C.F.S. Examining Wing, which visits all units and Commands at about nine-month intervals to discuss and co-ordinate flying practices and techniques throughout the Air Force, to test and assess pilots and to recategorize instructors. Western Union Examining Squadron is, incidentally, a unit with duties similar to those of C.F.S. Examining Wing, and it bases its methods on, and co-operates closely with, C.F.S. It is, however, of international character and composition. This year France is the host country, and the Squadron is, therefore, under a French commanding officer.

The R.A.F. Flying College.—This important unit is based at R.A.F. Station Manby. Its task is to ensure that air staff officers and potential air commanders understand the capabilities and limitations of modern aircraft, weapons, navigational aids, and operational techniques so that the skill of the aircrews can be applied with the most telling effect in air warfare. Officers of the rank of Wing Commander and Group Captain are normally selected for the course, and a variety of aircraft is flown, including Meteors, Vampires, and Canberras. Research into navigation and flying techniques is carried out, and a close liaison is maintained with establishments in America and in Allied and Commonwealth countries.

Practical experience and instruction is obtained when flights are made to many parts of the world, including polar areas. Officers from the U.S.A.F. and Commonwealth countries work side by side at the Flying College with those from the R.A.F. It provides a central meeting place for the solution of the problems of air operations. Its work is complementary to, but does not replace, that of the Staff College.

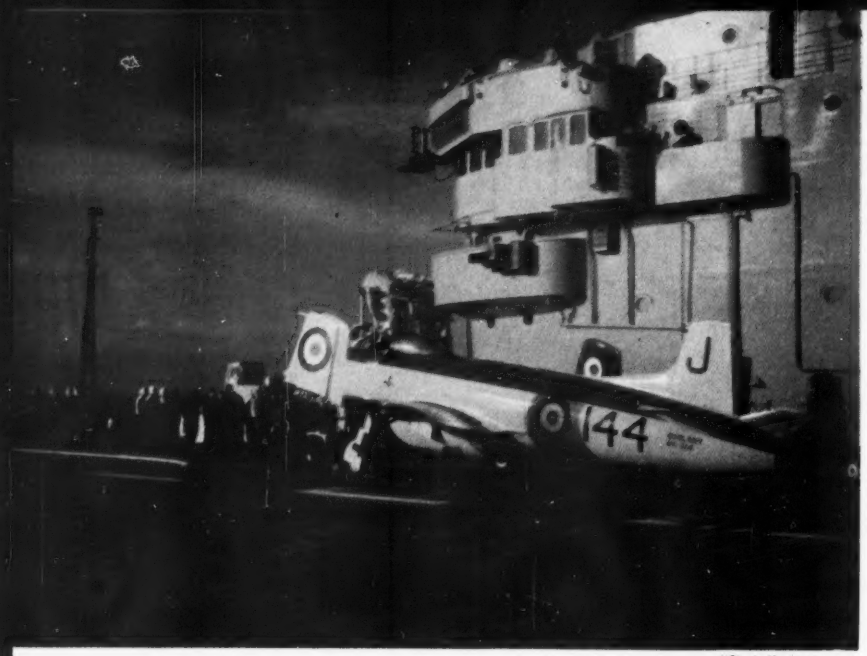
The Central Navigation and Control School is at Shawbury. Here navigation instructors and staff navigators are trained and refresher courses are carried out. The school also caters for air-traffic control and G.C.A. controllers.

The longer specialized navigation course (Spec. N.) is carried out at Manby where it can take advantage of the facilities and equipment provided for the Flying College.

Flying Training Command headquarters are pleasantly housed at Shinfield Park, Reading. The present Air Officer Commanding-in-Chief is Air Marshal L. F. Pendred, C.B., M.B.E., D.F.C.

Vampire Trainers with side-by-side seating, early production examples of which are shown here, are now going into service at Advanced Flying Schools. All jet A.F.S.s are to be so equipped.

"Flight" photographs



"Flight" photograph

Premier squadron and premier ship: Attackers of 800 Squadron embarked in H.M.S. "Eagle".

NAVAL AVIATION

NAVAL Aviation is a completely integral part of the Royal Navy. Its personnel are drawn from all branches of the Navy and the closest liaison is maintained between Naval Aviation and other parts of the Navy and other Services.

Naval Aviation is today bigger than it has ever been before and, in comparison with other Services, it has never been so well equipped. This was not so in the past; it was once a truism that Naval aircraft were archaic in appearance and were parsimoniously distributed. But now, at last, it really looks as if the Navy has, or is about to get, most of the things it needs in the way of flying equipment.

The main fighting rôles are, of course, filled by aircraft based on carriers. The Navy's front-line squadrons, as they are known, always go to sea to fight unless local requirements are of an unusual nature. Her Majesty's carriers have put up remarkable performances in the Korean war—so good, in fact, that if their work were discussed now, all that followed would be an anti-climax. Accordingly, carrier work will be deferred until the end of this account.

The requirements of Naval Aviation are such that, taken together, they demand extreme skill and hard work by all concerned. For the aircraft designer it is a never-ending fight to get the proverbial quart into a pint pot—and then make it fold into half-a-pint. For aircrew it is a matter of flying small aircraft, which cannot carry complex radio aids, in all weathers or at night, in tight formations, with sustained precision.

The first task of the Navy is the maintenance of free sea communications. This virtually reduces, in war-time, to a fight against the submarine, which, in turn can be subdivided into searching and striking. At the moment, the Navy has no aircraft capable of doing both tasks—neither has any other navy, for that matter, except that of America, with its shore-based P2V Neptunes—but the Gannet has been designed to fulfil this task.

The standard fixed-wing anti-submarine strike aircraft is a variant of the Firefly 6. This is a well-tried design and is giving fine service in a number of units. Anti-submarine search is done by a number of types, including Fireflies, Avengers and Skyraiders. The Firefly A.S.7 has been produced as an interim aircraft pending the introduction of the Gannet. Used as a shore-based trainer of A-S observers, it will equip No. 824 Squadron in July and other units later.

The Avenger has long been used as a maid-of-all work. Now, late-production TBM-3W Avengers are being made available under the M.D.A.P. These aircraft are cleared for carrier work and have equipped 815 Squadron this month. With the Firefly 7 units they will train anti-submarine crews in conjunction with the A-S School at Londonderry.

The Gannet promises to revitalize the whole anti-submarine set-up. It is not a large aircraft, yet it carries a crew of three, extensive search and strike radar, and still finds space for a most commodious weapons bay. Carrying all the latest offensive devices of its trade it should be a remarkable machine; each Gannet will virtually replace two, or more, aircraft now in use.

The Skyraider is a law unto itself, for the AD-4W aircraft (the type supplied to the Royal Navy under M.D.A.P. allocation) has radar so powerful that the aircraft can fill a number of unusual rôles in addition to straightforward sub-hunting. The Skyraider equips No. 849 Squadron whose task it is to train operational flights of four aircraft which then embark in carriers. 849's hefty black aircraft have been to sea more than once; when embarked they have proved beyond doubt the value of such aircraft in searching, detecting and controlling. Flights are being formed as fast as possible: two are already worked up, with the next two due to be fully trained in June and August.

Before leaving the anti-submarine picture attention should be turned to the possibilities of using helicopters for both finding and hitting submerged submarines. For this work the sonobuoy is used (a floating Asdic transmitting station) and for helicopters a "dunking" method, by which the sonobuoy is retained on the end of a cable and dipped in likely parts of the sea, is being developed. Sikorsky S-55s, supplied under M.D.A.P. funds, will be used to form a development squadron whose task will be to determine to what extent helicopters can replace fixed-wing aircraft in this vital work. The obvious advantage of the helicopter is, of course, that it can be operated from any small, flat surface such as could readily be made available on almost any kind of vessel. It is unlikely that S-55s could carry out search *and* strike work but bigger helicopters certainly could. America has one such type, the Bell HSL, already completing its initial tests, and their Lordships have not lost sight of this fact.

The second fighting task of Naval Aviation is the protection of convoys and the Fleet itself against air attack. Aircraft in the former rôle should, ideally, be capable of operating from small, slow carriers; those defending the Fleet need performance which can bring off an infallible interception of jet bombers before the latter reach weapon-release range.

The most effective fighter currently in use is the Supermarine Attacker F.B.2. When it entered service the Attacker became the subject of rumours concerning its accident-rate and its ability to fire its guns in the air. In the event, the type has proved itself a fine aircraft. Earlier this month we saw some of the Attackers

A Sea Hornet N.F.21 of 809 Squadron about to settle on "Eagle's" deck.

of 800 and 803 squadrons at work. both by day and by night, and there was every indication that the type is fully operational and popular with its pilots.

The view from the cockpit is good and performance generally as good as that of any other straight-wing aircraft—i.e., the Attacker can give any R.A.F. fighter a run for its money. For many months now the accident-rate has been just about zero. Serviceability, too, has become good and Attacker pilots are now logging hours at a great rate. And so far as the "firing of guns" rumour goes it may be said that, like all other fighters we have met, the Attacker cannot fire properly at its critical Mach number —a purely academic consideration, and one not confined to aircraft with wing-mounted armament.

Now coming into service, the Hawker Sea Hawk is being built in bigger numbers than was the Attacker, although it is again a straight-wing aircraft with a centrifugal-flow turbojet. The Sea Hawk looks a good aircraft and it has that valuable characteristic of making any pilot feel at home in it on first acquaintance; additionally the type is very pleasant and quiet. The Navy consider it will become a valuable strike aircraft, with a heavy offensive load, capable of doing even more than could its illustrious forebear, the Sea Fury. No. 806 Squadron already has Sea Hawks and 892 will form in August. It should also be noted that something like 100 Sea Hawks are due to be built by Armstrong Whitworths against "off-shore" funds, many or most of which will doubtless go to the Royal Navy.

Filling the vital "all-weather" rôle will be the two-seat Sea Venom. The first Sea Venoms will go to No. 890, due to form this year, and the type will replace the Sea Hornets which 809 have flown so well for so long. Both types have long range, carry radar and are fully cleared for carrier work.

As for the "fleet-defence" fighter, we cannot do better than quote Vice Admiral Mansergh, formerly fifth Sea Lord. In a lecture to the R.U.S.I. he said that "an aircraft is required which can operate at night or in bad weather conditions against high-performance bombers. In addition to the essential very high performance, this aircraft must be equipped with interception radar and carry a radar operator as well as the pilot." Although it is evident that nothing like this is yet in service, it may be remembered that a development of the Supermarine 508 twin-Avon fighter is now on large-scale order and, no doubt, is designed to meet this requirement.

The third duty of Naval Aviation is air strike against any available targets. This work differs from that carried out by, say, Bomber Command, in that the Navy choose more-localized targets and hit them from low level. It follows that the best aircraft for the job will be fast and manœuvrable, while carrying a good load of offensive stores. These stores, incidentally, include bombs, rockets, torpedoes and—eventually, perhaps, if the U.S. Navy can be taken as a guide—atomic weapons.

In the past, strikes have been carried out by aircraft classed as torpedo fighters, of which the Firebrand is the sole remaining example. Firebrands are gradually being pensioned off, but a number of units continue to fly the type with success; a colour photograph on p. 665 shows some of 827 Squadron embarked in *Eagle*.

The mainstay of the Navy's strike squadrons will soon be the Westland Wyvern S.4. After a protracted development period —but not unduly so, bearing in mind the problems to be overcome —the Wyvern is now in process of delivery to the Navy. No. 813 will be the first Wyvern unit, and we can testify to their eagerness to get started. All who have flown the aircraft like it, and much is expected of it in service. Although for the present it is a "runway-only" type, the Wyvern completed carrier trials years ago and should be carrier-based before long. The big Python turboprop provides truly remarkable performance, and many readers will remember the speed and aerobatic qualities of a fully loaded S.4 at Farnborough last year.

Apart from the rugged Firefly and Sea Fury, which can truthfully be said to form the backbone of Naval Aviation at present, and will be the stars in the Korean account on p. 692, there remains a host of second-line units whose tasks and equipment are worthy of some study.

Straightforward pilot-training for the Navy is done by the R.A.F., at Syerston, as far as "wings" standard. The pupil then graduates to Fireflies and Seafires at Lossiemouth and finishes up at Culdrose, Cornwall, on Sea Fury T.20s, or Meteor T.7s. Sea Vampires are also much used for training, and the Sea Vampire Trainer T.22 will shortly be introduced as a standard type. All these aircraft are finished in "lightweight natural metal," with yellow bands; other Naval aircraft are painted "extra-dark sea grey" above and "sky" beneath, except for the Skyraiders which are non-standard black.

Meteor 7s are found throughout the Navy. All are kept in first-class condition and put in many hours on diverse duties. Their major task is the renewal of instrument ratings for pilots ashore; it is not usual for a pilot to be embarked without a green or white card rating. Towing of sleeve targets is another important

One of 809's "eager"-looking Sea Hornets parked at Culdrose.

"Flight" photographs

Sea Furies which formed part of the 52nd Carrier Air Group.

Meteor function, for Naval gunners have had enough of targets that could do no more than 150 knots. Now, the 32ft winged target is being towed behind the same T.7s; previously these strange black and yellow beasts were handled only by Mosquito T.T.39s or Sturgeons. This towing work is the prerogative of 771 Fleet Requirements Unit (all second-line squadrons are numbered in the 700 series). 771 also carry out all manner of other domestic tasks; one of their regular duties is the photographing of ships, dockyards and airfields.

The Service Trials Unit, No. 703 Squadron, is responsible for the proving of carrier catapults and arrester gear after a refit. The S.T.U. also takes each new type of aircraft through its carrier trials and tests equipment developed by the Safety Equipment School and the Air Medical School, at Gosport.

A very important Gosport-based unit is No. 705 Helicopter Squadron, which was probably the first all-rotary-wing squadron in any Service outside the United States. Their present equipment is the Westland Dragonfly H.R.3, although many other types, including the Skeeter and Sycamore, are frequently to be seen in the Gosport circuit.

The Navy early appreciated the immense value of helicopters and already has over 50 in service—a big number in comparison with other non-American Services. Each carrier has two Dragonfly H.R.1s for use as rescue and liaison transports, and they are proving cheaper and more versatile than the destroyers which formerly filled these rôles. Two more are to be on the strength of every coastal R.N. Air Station, with similar duties—formerly carried out by Sea Otters. That they are of some use is evident from the recent remark of the Commander (Air) of one such station, who said he "couldn't understand how the Navy had ever got on without them."

Although 705's Dragonflies did great work in Holland earlier this year, lifting eight people at a time from areas cut off by flooding, the air/sea rescue evidence indicates that, with a crew of two, only one survivor can be winched out of the water per trip. This performance is bettered if there is a wind, of course, but the Westland Sikorsky WS-55 will soon enter service in the A.S.R. rôle, leaving the Dragonflies for training work.

American-built S-55s were supplied under M.D.A.P. last year and they equip No. 848 Squadron. Barely one month after their arrival in Great Britain these big helicopters were in action in Malaya, having been shipped out in H.M.S. *Perseus*. Their crews got in practice flying during the voyage in preparation for

THE QUEEN'S AIR FORCES . . .

A Sea Fury and Fireflies being spotted for free take-off from "Vengeance".

their present arduous tasks outlined on page 668. One is seen at Kuala Lumpur on p. 666.

The most recent addition to the Navy's helicopter strength is a fleet of Hiller 360s (HTE-2s in the U.S. Navy) which have been supplied under M.D.A.P. funds. These dual-control aircraft are likely to prove very useful as basic trainers, in which work they are more economical than the more powerful equipment previously used.

For training radio operators and navigators the Navy uses the Sea Prince flying classroom. Unlike R.A.F. Princes, the Sea Prince is always seen with twin main-wheels on a long-stroke leg; a nose radome is another frequent addition. Additional radio training is carried out by the all-yellow Ansons of the Naval Air Signals School, which Air Service Training, Ltd. operate under contract.

Front-line squadrons are always disembarked for working-up, or for brushing up their operational flying. This is due to several factors, among them the availability of ranges and the higher rate at which such training can be carried out ashore, without the necessity of flying long sorties. Even deck-landing practice can be carried out more rapidly on a runway. But the true home of the operational Naval aircraft is the carrier.

The largest ship in the Royal Navy, H.M.S. *Eagle*, of 45,000 tons, is serving with the Home Fleet. Other Fleet carriers in commission are: *Implacable* and *Indefatigable*, with the Home Fleet Training Squadron; *Indomitable*, with the Home Fleet; and *Illustrious*, the training and trials carrier. Light Fleet carriers are: *Glory*, in Korea until July; *Ocean*, which took over in Korea this month; *Theseus*, with the Home Fleet; and *Triumph*, earmarked as a cadet training ship.

Other carriers are: *Ark Royal*, *Hermes*, *Bulwark*, *Albion* and *Centaur*, fine ships which should be commissioned next year; *Leviathan* and *Hercules*, launched but suspended; *Powerful* and *Majestic*, now fitting out for the Royal Canadian and Australian navies, respectively; *Vengeance* and *Sydney* now on loan to the Australian navy, and *Magnificent*, with the R.C.N.; *Victorious* and *Warrior*, being modernized; and the Maintenance carriers, *Unicorn* (Far East), *Pioneer* (reserve), and *Perseus* (with steam catapult, on ferrying and trooping).

The Light Fleet carriers have probably been, in turn, the hardest worked ships in the Navy. They have borne the entire load of the British air commitment in Korea, with the exception of a small number of equally-hard-working Sunderlands and Austers. The actual ships and units engaged have been: *Triumph* (800 and 827 Squadrons), June 1950 to October 1950; *Theseus* (807 and 810), October 1950 to April 1951; *Glory* (804 and 812), April to September 1951; H.M.A.S. *Sydney* (805, 808 and 817), October 1951 to January 1952; *Glory* (804 and 812), January to May, 1952; *Ocean* (802 and 825), May to November, 1952; *Glory* (801 and 820) November 1952 to present.

Their work has been an unusual one for the Navy—close support of ground forces. It has taken them over most of Korea, although the "British" sphere has been the West coast, from a carrier steaming in the Yellow Sea. The aircraft used have been Hawker Sea Furies and Fairey Fireflies. Neither type can equal, on paper, the performance of their American counterparts, neither can a British Light Fleet carrier embark anything like as many aircraft as can the big ships of the U.S. Navy which have served the Korean East coast. But much of the leeway has been made up by a remarkable operating efficiency, which has permitted unprecedented sorties-per-day figures to be achieved.

Fine results have been achieved by every carrier in Korea, but *Theseus* was responsible for starting off the intensive flying and it is worth noting some of the things she achieved. Originally there were 33 aircraft embarked and, under the authority of the Korean Joint Operational Control, this group frequently put up from 70 to 100 sorties a day, in conjunction with other strikes from land-based aircraft.

Serviceability with the Sea Furies averaged 96 per cent. Engines, undercarriages or wings were regularly changed overnight and it became standard practice to change defective equipment with a serviceable item from a battle-damaged aircraft until, eventually, the latter became a Christmas tree of trouble for H.M.S. *Unicorn*, the depot and repair carrier.

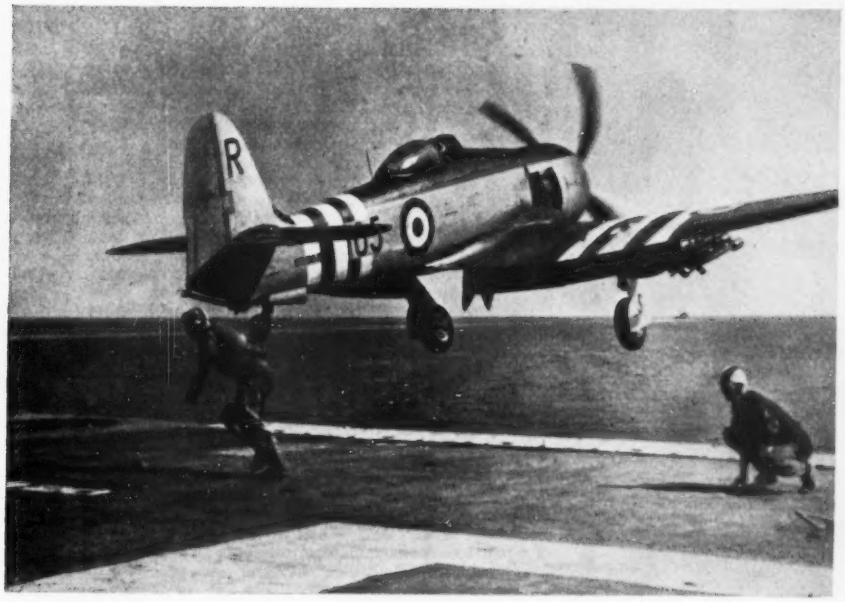
As flying often started before dawn and continued until sunset, it was essential to get the aircraft for the first two events of the following day spotted, fuelled, armed and lashed down the night before. After a little practice, techniques were brought to a standard of perfection that had probably not been attained previously. The sole aim was to keep as many aircraft available for flying as possible, and this demanded not only a quick turn-round, but some rapid thinking each time an aircraft returned from patrol. For example, if battle-damage or unserviceability was such as to keep the aircraft out of the next event it would be left alone until all other machines had been prepared.

Keeping up really intensive operational flying is most instructive, but one can have too much of anything. Three, four and more sorties per day is hard work for any pilot, especially when he is flying a fighter on patrols and strikes lasting two hours or more. And one would have expected the inhospitality of the terrain and sea to have added to pilot-fatigue. In the event, the number of pilots who asked for a rest could be counted on the fingers of one hand; morale remained excellent at all times, as it always does when men are doing a job of this nature.

Neither did morale drop when the Mig first appeared; prior to the advent of this speedy opponent the air opposition had been

A flight of Skyraiders of 849 Squadron seen over Cornwall earlier this month.

"Flight" photographs



On the left, a rocket-laden Sea Fury of 804 Squadron is catapulted from the deck of H.M.S. "Glory" in Korean waters.

Two Firefly 6s recently provided transport for members of "Flight's" staff during a visit to Naval air stations. Here one is seen from the other; the aircraft belong to 1840 R.N.V.R. Squadron, of the Channel Air Division.

"Flight" photograph

virtually non-existent, but this has certainly not been the case during the past two years. H.M.S. *Ocean* was the carrier which first encountered Mig-15s. Just before the end of her fifth patrol American aircraft dropped leaflets stating that they were going to bomb each North Korean city in turn, and that the Migs were too scared to do anything about it. This evidently nettled the latter because, at the end of the fifth patrol, Lt. Bob Hallam and his flight of Sea Furies of 802 Squadron came across eight of the swept-wing fighters.

This first group of Migs made passes at a flight of Fireflies of *Ocean's* other squadron (825) but no casualties were caused. It was Lt. P. Carmichael (802) who had the first real brush with the enemy fighters. He has related the story of this occasion as follows :—

"The encounter that my flight had with the Migs took place at 0600. My No. 2, Sub-Lt. Carl Haines, said 'Migs five o'clock.' I did not see them at first and my No. 4, Sub-Lt. 'Smoo' Ellis, gave a break. We all turned towards the Migs. Two went for my Nos. 3 and 4, Lt. Pete Davies and Sub-Lt. Ellis. They were seen to get good hits on one, who broke away with smoke coming from him.

"Though I have been credited with shooting down the first Mig, I feel that it was more of a flight effort than an individual one, because the one that crashed behind me was fired at by all of my flight. My Nos. 3 and 4 then had another attack at them and got hits on this one. He broke away and the rest of the Migs broke off the engagement and escorted him away.

"The impression we got was that these Mig pilots were very inexperienced and did not use their aircraft to any advantage at all. I think it was the next day that we had another engagement with eight Migs and we were very lucky to get away with it. I reckon they must have sent the instructors down! These pilots put their aircraft to the best use and we managed to ease our way to some cloud that was about 20 miles away. One Mig got on my tail and my No. 3 fired at him and he broke away. The only Mig who made a mistake was one who made a head-on attack on my Nos. 3 and 4 and was hit by them and seen to go away with a lot of smoke and flame coming from him."

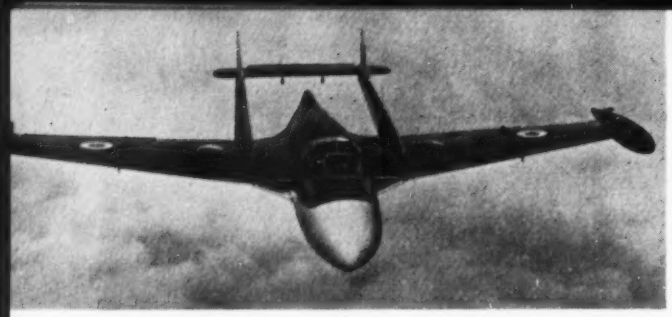
Lt. Carmichael goes on to speak of the ruggedness of the Sea Fury. This, coupled with its excellent dog-fighting qualities, enabled 802 Squadron to destroy two Migs on that first occasion. The enemy pilots have since learnt that, if Royal Naval aircraft are around, one fast pass is all that is advisable; it is dangerous to "mix it" with a Sea Fury.

But the chief concern of the R.N. aircraft has been ground striking in close support of the Allied troops, in which work they have co-operated with the "Mosquito" (Harvard) target-indicating aircraft. Both Firefly and Sea Fury squadrons have become extremely proficient in hitting things. To quote Lt. Carmichael again: "We could usually guarantee that at least one bridge was hit in a flight of four. I believe on one occasion a flight led by Lt. Paddy McKeown hit four bridges in one sortie. Some of these bridges . . . had been knocked down at least 10 times. When we were doing close air support where we knew the flak was heavy we always did the 65 deg dive. Flak in most of Korea was fairly heavy. Enough to keep one worried the whole time."

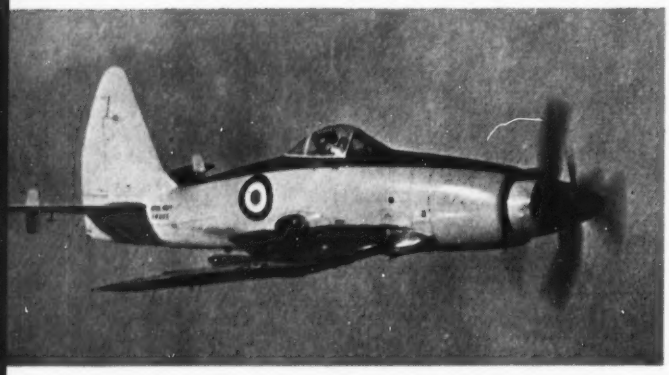
If one did have the misfortune to get knocked down, there was the satisfaction of knowing that one would soon be picked up if it could possibly be done. The story of Lt. S. Leonard, of *Theseus*, is a good example. His Sea Fury crashed while rocketing Communist troops 90 miles behind the lines. The fuselage buckled at the cockpit, and Leonard was pinned in his cockpit with both legs and one arm broken. His flight, and a relief flight, shot up the enemy troops and prevented them from getting too near the crashed Fury. Leonard came to, fired his revolver—with his broken arm—at the nearest adversaries, and passed out again. After one hour a helicopter arrived with pilot and doctor on board; they hacked him out, keeping the enemy at bay with automatic weapons. Rapidly Leonard was "snatched" and flown home, receiving a blood-transfusion on the way. He is today an active officer.

Less exciting, but just as commendable, is the record of deck-landing accidents set up by the Korean operations. The normal rate is taken as one per hundred landings. *Theseus* ran off a clear run of 1,400 accident-free landings and then had several more runs of over 1,000. This sort of performance still obtains.

The list of targets destroyed in Korea is truly fantastic and includes just about everything that could be hit with 60 lb rockets, 500 and 1,000 lb bombs and 20mm cannon shells. A very large



Soon to be the standard Naval all-weather fighter: the versatile de Havilland Sea Venom N.F.20.



The Queen's Air Forces . . .

proportion of all the Royal Naval pilots of operational age have been through a Korean tour; several are beginning a second.

With such men, Naval Aviation has established a reputation that is second to none. After 1945 the Service suffered a rundown as severe as that experienced anywhere; in particular, carrier-strength dwindled to a point when seagoing air power was virtually non-existant. But, as listed on p. 692, the Royal Navy's carrier strength is once more becoming very powerful.

This strength build-up is likely to be hastened by two far-reaching developments, both of which originated in this country. The first is the steam catapult—or "hot ride" as it has become known. This apparatus takes steam from the ship's main boilers and provides a safe and sure get-away for aircraft far heavier and faster than are in service at present; additionally, it offers a great tactical advantage, in that the carrier need no longer steam into the wind when aircraft are being launched.

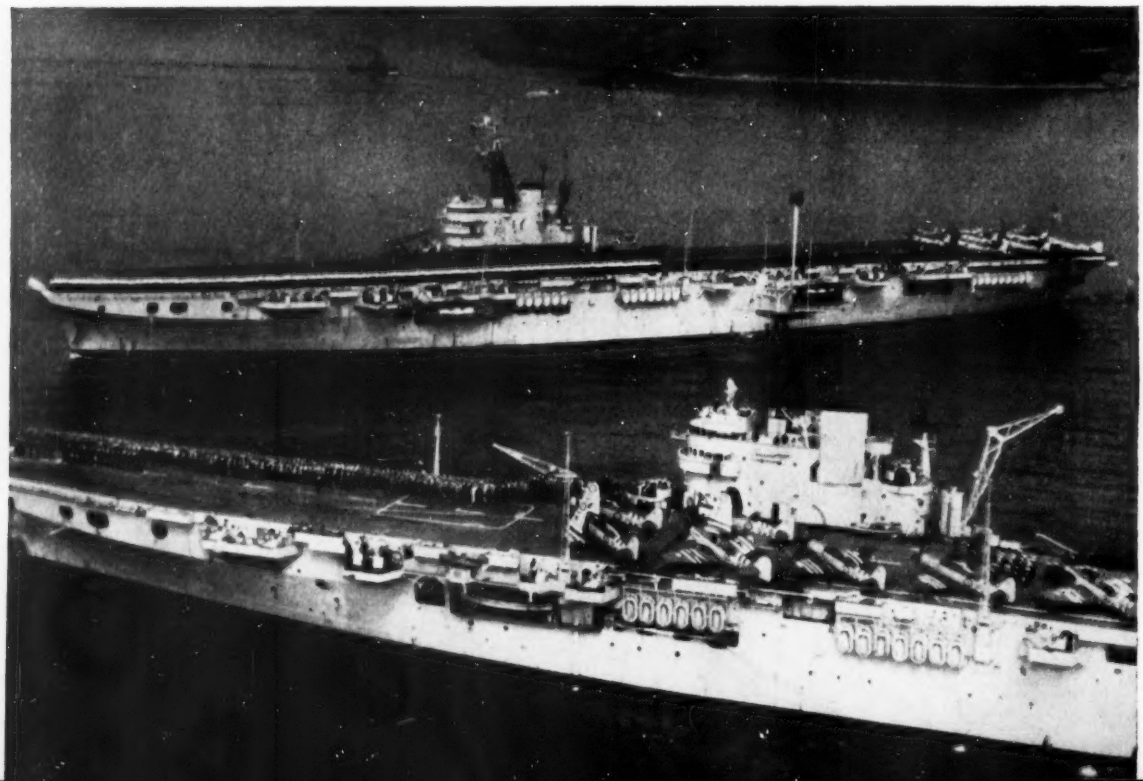
The second development, the angled deck, enables much more efficient use to be made of deck space and also allows safer landings without the risk of hitting parked aircraft or being arrested by a barrier. Vice-Admiral E. W. Anstice, C.B., Fifth Sea Lord, states that these two new devices will be introduced into our carriers and will greatly increase their fighting efficiency.

Altogether, the impression that Naval Aviation gives an outside observer is that, whatever it has, it uses—and keeps in fine condition. This applies not only to aircraft but to all manner of ground equipment, and to men also. One does not seem to find derelict aircraft on Naval airfields, neither is it usual to find a pilot acting as a permanent air traffic controller, nor an observer misemployed in a wardroom. Hard work is found everywhere—both in doing the old and perfecting the new.

Now being delivered to squadrons of the Royal Navy are the Westland Wyvern S.4 (left, above) and the Hawker Sea Hawk F.1.

"Flight" photographs

(Below) H.M.S. "Theseus," in the rear, is manning ship as she leaves a Japanese harbour en route for England after her Korean tour. She is being cheered by her relief, H.M.S. "Glory," standing-to in the foreground.



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"Flight" photograph

Two Sycamore 50s being guided down to the deck of H.M.A.S. "Vengeance."

THE QUEEN'S AIR FORCES . . .

COMMONWEALTH NAVAL AVIATION

ALTHOUGH relatively few personnel are involved, a great contribution to our air power is made by the Royal Australian Navy and Royal Canadian Navy. Of the two, the R.C.N. was the earlier to begin flying—in 1918; but the Canadian Naval Air Service was disbanded the following year and not re-formed until 1943.

Since the latter year Canadian naval aviation has gone from strength to strength, and is today hard at work on problems of expansion, training, and providing a large and efficient nucleus upon which to build in time of emergency. Four operational squadrons are maintained: the 30th Carrier Air Group, consisting of 881 Squadron (Avengers) and 871 Squadron (Sea Furies), and the 31st Support Air Group formed by 880 Squadron (Avengers) and 870 Squadron (Sea Furies). Other types used are Fireflies, Harvards, Bell and Sikorsky helicopters and—shortly—heavier and faster operational types.

Anti-submarine work is the chief duty, and a school for anti-submarine observers is one of the most important units at H.M.C.S. *Shearwater*, a shore-establishment at Dartmouth, Nova Scotia. Here, personnel (of the R.C.N. and Royal Navy) complete a nine-month course, during which they fly some 200 hours in Avengers, which are rebuilt and maintained by the Fairey Aviation Company of Canada, at their factory nearby. The manifold tasks of observers have proved too much for one man and, in the R.C.N., the three-seat Avengers carry an observer's mate—the only lower-deck aircrew.

The Light Fleet carrier H.M.C.S. *Magnificent* has been on loan to the R.C.N. since 1947 and will remain Canadian until about 1956. Then, H.M.C.S. *Bonaventure* will be in commission; she is to be a light fleet carrier of the latest type, embodying the angled deck, steam catapult and every other device for increasing fighting efficiency. Her thick deck and heavy-duty arrester gear will permit the operation of the biggest and fastest aircraft now forseen. She was originally laid down as H.M.S. *Powerful* and is now under construction at Belfast. No reference to *Bonaventure* appears in this year's Navy Estimates, indicating that she will not be on loan to Canada but has been bought outright.

In Exercise Mainbrace last autumn, *Magnificent* took an active part. The Sea Furies of 871 shot up a variety of targets, while 881's Avengers—or "Turkeys" as the Canadians know them—found and attacked submarines. All aircraft had a rough time in the severe weather which prevailed, and a number burst tyres on *Magnificent*'s pitching deck. An anecdote worth recording concerns Lt. Townsend who, when the instrument lights of his Avenger failed, landed with an electric torch between his teeth.

Aviation became established in the Royal Australian Navy in 1949, when H.M.A.S. *Sydney* arrived at Jervis Bay, N.S.W., with the 20th C.A.G. on board. This consisted of Sea Fury and Firefly aircraft, with pilots and observers drawn from both the R.N. and R.A.N. and formed up in England. They disembarked to R.A.N.A.S. Nowra (H.M.A.S. *Albatross*) 22 miles inland in a desolate area of bush. Today, Nowra is a fine and well-equipped station, and Australia's third naval fighter squadron (850) was formed there earlier this year. About 80 per cent of the R.A.N. aircrew are Australian now, although many ex-R.N. remain.

H.M.A.S. *Sydney* later returned to the United Kingdom for the 21st C.A.G. and, in September 1951, proceeded to Korea where she was in action until January 1952. Her squadrons then were 805, 808 and 817. The Fireflies put up some remarkable performances: on one occasion eight aircraft, with two bombs each, destroyed four bridges in a single operation. Australia is clearly pleased with her Fireflies, for Faireys have an Australian order for 40 Gannets, due for delivery in 1955. The three R.A.N. fighter squadrons are all equipped with the Sea Fury. It is held in high esteem by the Service, but more modern equipment is soon to come, for D.H. Australia is building the Sea Venom.

Early this year the R.A.N. took over the carrier *Vengeance*, which will remain on loan for four years. Then the carrier now known as *Majestic* will be transferred to Australia to take her place. *Majestic* is another Light Fleet carrier of the latest type with "every modern improvement"; she is at present fitting out at a British yard.

Helicopters have already been introduced to the R.A.N.; *Vengeance* carried with her three Bristol Sycamore 50s which will be used for a variety of strenuous duties. One will stand by, with Leonides running, at every take-off or fly-on of aircraft, to act as a rescue vehicle. Reconnaissance and liaison are also part of the Sycamores' daily round; they are very well equipped, and have a number of basic improvements compared with earlier 171s. Two of them are shown in a photograph on this page.

A Grumman Avenger of the R.C.N., of which some 150 are in service.

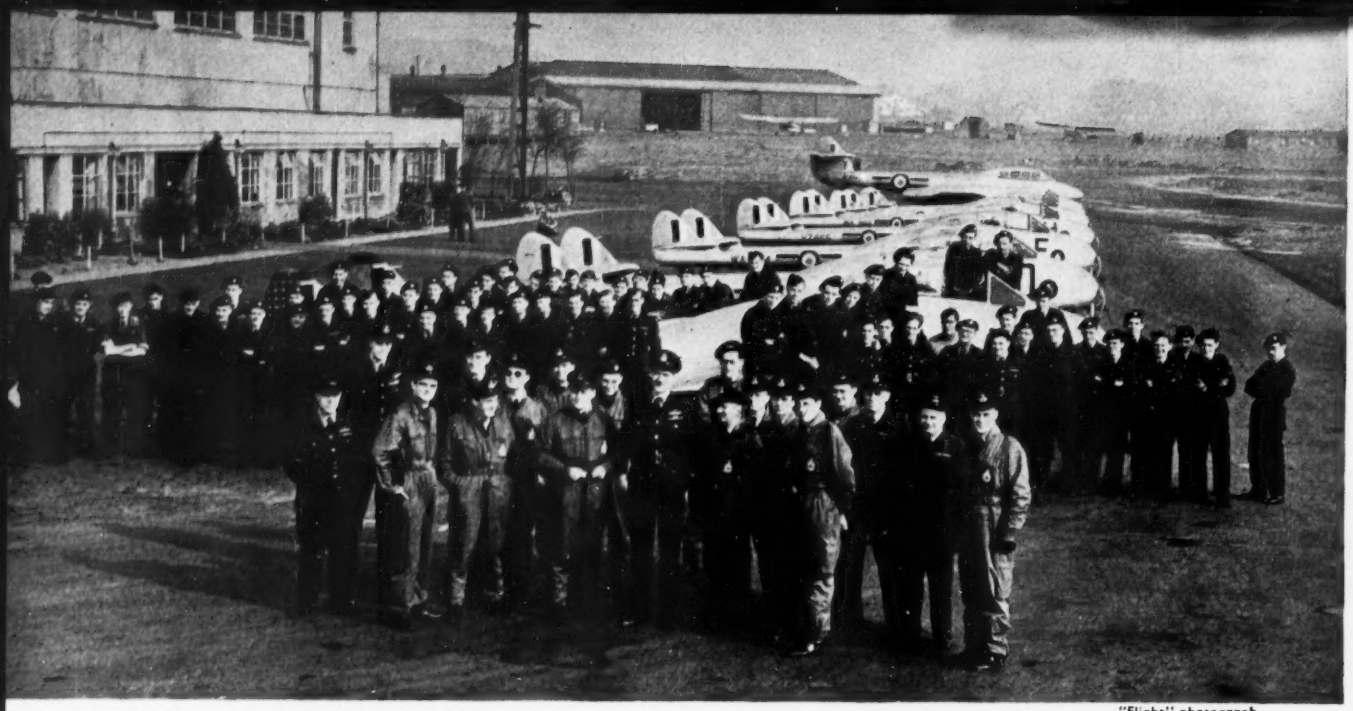
R.N.V.R. AND W.R.N.S.

TWO other Naval Services contribute to the strength of Her Majesty's Air Forces: The R.N.V.R. and the W.R.N.S. Like other reserve units, the R.N.V.R. (Air) Squadrons are assisted by some permanent staff officers of the Royal Navy and by regular aircraft servicing personnel. But the squadron C.O. is always a Lt. Cdr.(A), R.N.V.R., and all the aircrew are V.R. personnel, most with war experience but including an increasing proportion of ex-National Service men.

Training programmes generally parallel those of the R.Aux.A.F. (p. 695). All R.N.V.R. personnel, both ground and flying, undertake to serve five years in the first instance. Squadrons are based at R.N. Air Stations in the United Kingdom and, in some cases, a station houses two V.R. squadrons. "Annual training" is usually carried out embarked in a carrier or at an overseas base such as Malta. Flying equipment is largely made up of Sea Furies, but other squadrons have Fireflies (photograph, p. 693) and Seafires, the latter being probably the last of their family to be seen in this country.

In a special Naval Aviation issue of this journal which appeared in April, 1951, it was written that: "pilot's mate courses are undertaken at Yeovilton (H.M.S. *Heron*), where also the specialist training of Wren air mechanics is given; it is relevant to observe here that Wren air mechanics are also eligible for training as pilots' mates, and we cannot help reflecting that, in this connection, the choice of title for this trade was somewhat short-sighted."

Be that as it may, no account of Naval Aviation could be regarded as comprehensive if it omitted mention of the work of the Women's Royal Naval Service. Apart the expected domestic, signals and secretarial duties, Wrens are found employed upon some of the most highly technical and responsible jobs in the whole of Naval Aviation. To an even greater degree than do the W.R.A.F., the W.R.N.S. provide skilled personnel for duties connected with aviation—aircraft servicing and radar plotting, for example.



"Flight" photograph

The pilots, ground crew and aircraft of No. 603 (City of Edinburgh) Squadron, R.Aux.A.F., of which unit Her Majesty the Queen is the Honorary Air Commodore.

THE QUEEN'S

AIR FORCES . . .

AUXILIARIES AND RESERVES

AGAINST the background of political strife which now keeps the world torn asunder, it behoves all who can to be prepared to do their share in defending the British Commonwealth. In the various sections of the Royal Auxiliary Air Force and the reserves to the Royal Air Force there are ample opportunities for people of both sexes, and of any age up to 50 years, to show their evaluation of the worth of freedom.

The Royal family itself sets an example. The Queen is Honorary Air Commodore of No. 603 (City of Edinburgh) Fighter Squadron, R.Aux.A.F., No. 2603 (City of Edinburgh) L.A.A. Squadron, R.Aux.A.F. Regiment and No. 3603 (City of Edinburgh) Fighter Control Unit. The Queen Mother acts in a similar capacity to the City of London units and the Duke of Gloucester has bestowed his patronage to the County of Gloucester auxiliaries. Any who are inclined to feel they are too busy for such service may remember that Sir Winston Churchill himself manages to make sufficient time to fill very ably the post of Honorary Air Commodore to No. 615 (County of Surrey) Squadron, R.Aux.A.F.

It has been a tradition of the R.A.F. to raise part of its strength as auxiliaries and the five original squadrons were first formed in 1925. These were : No. 502 (Ulster), No. 600 (City of London), No. 601 (County of London), No. 602 (City of Glasgow) and No. 603 (City of Edinburgh).

By the outbreak of war in 1939 the Auxiliary Air Force had grown to 20 aircraft squadrons and 47 balloon squadrons. It fell to the lot of the Edinburgh squadron to shoot down the first raider in the first raid on Britain. This was during the attack by German bombers against naval units in the Firth of Forth on October 16th, 1939. This raider fell in the sea but the same squadron shared with the Glasgow squadron the honour of shooting down the first raider on to British soil—a Heinkel 111. on October 28th, 1939. The foregoing are but highlights. There was not a single theatre of war in which the Auxiliary squadrons did not serve with distinction and it was in recognition of this fact that the late King George VI conferred the royal prefix to the title of the force.

After the war the force was re-formed and expanded to meet a wider range of commitments. There are now 20 fighter squadrons and 27 fighter control and radar reporting units, all of which come under Fighter Command; 12 squadrons of the Royal Auxiliary Air Force Regiment; one air-transport squadron; and five air observation-post squadrons.

All these units are affiliated to, and linked with, the counties or cities from which they take their names, and because of this geographical distribution it falls to the Territorial and Auxiliary Forces Associations to administer and discharge a wide range of responsibilities on their behalf. Policy is, of course, controlled by the Air Ministry, where the Director of Auxiliaries, Reserves and Air Cadets—at present A.V-M. W. M. Yool, C.B., C.B.E.—advises the Air Council.

The fighter squadrons form an important component of Fighter Command and are based, so far as possible, on airfields reasonably accessible to the areas from which the personnel are recruited. This, however, becomes increasingly difficult, chiefly owing to the airfield requirements of modern jet aircraft.

Because of the high standard of flying efficiency demanded, the future intake of fighter pilots for the R.Aux.A.F. will come mainly from National Service pilots and from Regulars passing on to the Reserve. The day of the civilian joining a squadron and being taught flying from the *ab initio* stage has, regrettably, gone.

The single Auxiliary transport unit came into being in December 1950. Designated No. 622 Transport Squadron, R.Aux.A.F., it is recruited from civil aircrews—mainly of Airwork, Ltd.—and stationed at Blackbushe in Hampshire. The routine wartime duties of the squadron crews would differ but little from those of their normal occupations, but for specialized military operations, such as supply and paratroop dropping and glider towing, the unit has two Valettas on its strength.

Recruitment of ground crews is on a different footing. Many men are wanted to make up deficiences, and it is hoped that young men who want to join the R.A.F. on call-up for National Service will contact their local Auxiliary unit before call-up, with a view to giving service in that unit on completion of their full-time obligations. The Air Ministry states that anyone prepared to give such an undertaking will have every chance of doing the greater part of his full-time service in that unit, should he wish to do so.

No less important than the actual fighter squadrons are the fighter control and radar reporting units, which are, so to speak, the eyes of the fighters. Plotting and charting the approach of enemy aircraft and the direction of fighters to meet them is interesting and colourful work. Large numbers are wanted to bring these units up to strength, and it is here that the older men and women have their chance. Volunteers of either sex up to the age of 50 years are accepted for training.

A way for younger women to serve in these units is for them to join the W.R.A.F. Volunteer Reserve (Fighter Control Section) for six months' full-time training as radar supervisors, radar operators or fighter plotters, with a view to subsequent service in the W.R.Aux.A.F., to which they will be voluntarily transferred.

The R.Aux.A.F. Regiment is another way in which a healthy man, of the open-air type, can serve his country. The units are, for the most part, located alongside the fighter squadrons, and

A Bofors gun crew of No. 2603 (City of Edinburgh) L.A.A. Squadron, another unit of which the Queen is Honorary Air Commodore.

are trained primarily in the rôle of close defence of airfields.

The A.O.P. squadrons, although part of the R.Aux.A.F., are at the tactical disposal of the Army, and this fact is reflected in the make-up of the units. The commanding officers and pilots are all from the Territorial Army, as are 50 per cent of the ground staff, but the aircraft are maintained by members of the R.Aux.A.F., with a full time R.A.F. adjutant acting also as flying instructor.

All of the foregoing units have a healthy social side to their activities, many having town headquarters. Every effort is made to make the 15 days' compulsory training—a more descriptive name for which is summer camp—attractive. This year, 11 of the squadrons are going to Germany and a further five to Malta. It is planned, also, to send eight of the F.C.U.s to Germany together with two squadrons of the R.A.F. Regiment.

Closely allied to the Auxiliaries are the university air squadrons, the primary function of which is to foster among members of the universities an interest in the R.A.F., with a view to their preparation for commissioned service in the Regular, Auxiliary, and Reserve air forces, the air branch of the Royal Navy, and the R.N.V.R., which has fighter and anti-submarine squadrons recruited on regional lines in a manner very similar to those of the R.Aux.A.F. The university units are also designed to provide an interest in the technical side of flying and its associated problems, and to maintain liaison with the university authorities in research problems affecting aviation generally.

The scheme was introduced in 1925, when the squadrons at Oxford and Cambridge were formed. Later, an additional squadron was instituted at the University of London. On the outbreak of war the squadrons closed down, but in 1946 the scheme was revived. Eleven university air squadrons were then established as part of the R.A.F.V.R., and the present total stands at 17.

Members serve either as commissioned officers or as officer cadets, according to their qualifications and previous experience. The majority, on entry, have no flying experience and the training syllabus is designed to bring them up to the standard of the R.A.F.V.R. Preliminary Flying Badge. Chipmunk aircraft are used but those advanced members who intend joining the R.Aux.A.F. on going down from the university may be given experience on Harvards, followed by further training in Flying Training Command to bring them up to full "wings" standard.

In addition to the actual flying side, certain of the university squadrons also provide training in navigation, fighter control, technical and airfield construction duties. Of the three fighter control units, those established at Oxford and London are open to both men and women students.

The Royal Air Force Reserve, as the title implies, is made up of the following classes: R.A.F. Reserve of Officers (ex-regulars and National Service list); Class E (ex-regular airmen); Class H (ex-National Service airmen); and officers and Class G airmen who are released personnel but are still liable for re-call in an emergency.

The only channel of direct entry into the R.A.F. Reserve is through the R.A.F. Volunteer Reserve. Owing to strategic, economic and other considerations, major changes in the planning of the R.A.F. have been made. A direct consequence of this is that reserve aircrew requirements have had to be re-assessed, not only in numbers but also in age, experience and qualifications. This re-assessment has shown that it will be essential to concentrate on refresher training of young men with recent experience of flying modern operational aircraft. Suitable aircrew with the requisite experience will, during the next few years, be forthcoming from National Service men and from young regulars who have completed short-service commissions.

Only those members of existing aircrew who can satisfy the very strict conditions now to be applied will be given flying training. A large proportion of the R.A.F.V.R., aircrew whose flying experience dates from the war, will cease to be trained. Recruitment will, for the most part, be from cadets of the A.T.C. and R.A.F. sections of the Combined Cadet Force who have successfully completed a flying scholarship.

The numbers of ground personnel required has also been substantially reduced; nevertheless, large numbers are still required to meet deficiencies in the advanced and skilled trades, particularly in the engineering, radar and electrical groups. There is also a pressing need for recruits in the reserve flights of the control and reporting system.

For the air-minded youngster there can be nothing better than membership of the Air Training Corps or the R.A.F. section of the Combined Cadet Force. The objectives of the A.T.C. are to encourage an interest in aviation, and to give training which would be useful in either civil life or the air forces. Command, training and adminstration (except for certain responsibilities vested in the Territorial and Auxiliary Forces Associations) come under Home Command, and these functions are exercised through six group headquarters and 51 A.T.C. Wings. In all there are over 800 squadrons and a total cadet strength of more than 40,000. Proficiency in training carries with it certain advantages for boys entering the R.A.F. either on National Service or on regular engagement.

The boys are given many opportunities to fly, and selected cadets can also, on occasions, go in Service aircraft on overseas flights. In addition, cadets can undertake gliding training. For the really keen young men there are the flying scholarships, which enable cadets to be trained up to the Private Pilot's Licence standard. The flying scholarship scheme was introduced three years ago, and up to last March 1,075 scholarships had been granted. It is expected that a further 500 will become available during the current year.

Cadets recommended for these scholarships have first to pass the full pre-assessment test as applied to R.A.F. aircrew candidates at the Aircrew Selection Centre, Hornchurch. Those who subsequently complete the scholarship course have a good prospect of being accepted for flying duties on call-up for National Service, or on joining for Regular service. The flying training is undertaken by the civil flying clubs.

Another attractive scheme for A.T.C. cadets is that which allows for exchange visits with their opposite numbers in Canada, India, Pakistan and the United States. These trips provide most interesting experiences for the cadets.

The Combined Cadet Force is based on schools, each of which has a basic section for initial training in subjects common to all three Services, and also one or more specialist sections. R.A.F. sections are trained under the supervision of Home Command and those with a strength of 30 or more cadets are provided with a primary glider, to enable gliding instruction to be given, during term time. The present strength of the 187 R.A.F. sections of the force number more than 6,000.

Airmen and airwomen of the Royal Auxiliary Air Force at work in the operations room of the Fighter Control Unit in the London area.

"Picture Post" Library

THEN AND NOW: Alan Cobham's D.H. 50 alighting at Westminster after flying from Melbourne in 27 days in 1926; and the Canberra P.R.3 in which F/L. Whittington flew to Darwin in 22 hours this year.

IN THE QUEEN'S LIFETIME

HIGHLIGHTS OF BRITISH AVIATION SINCE 1926

IN seeking to record the history of British Aviation during the lifetime of our Queen we are reminded, appropriately enough, that the story begins co-incidently with what was in many ways a new phase of aviation itself. By 1926, when the Princess Elizabeth was born, the country had at last recovered from the exhaustion of the Great War years, and many of the wartime types of aircraft still in Service use and also in civil employment had at last given place to new designs. No longer did passengers travel precariously to the Continent in twos and threes in converted bombers; they flew by the dozen in relative comfort, in machines that had already come to be known as "airliners."

The man in the street, in fact, was beginning to discover aviation. A light-aeroplane and club flying movement that seemed to hold enormous promise was getting under way: though flying instruction was not cheap, he could buy himself one of the new de Havilland Moths for £595.

Nearly all the big names we know in the aviation industry today were big names then; there were only a few smaller concerns whose names would be unfamiliar now. There had already been pioneer flights round the world, to the North Pole, across the North and South Atlantic and to South Africa, India and Australia; but it was round about this time that an era of brilliant long-distance flights began, some by solo pilots, most of them regarded as foolhardy, all of them an inspiration to adventurous youth—the "golden age of sporting flying," this period has been called.

But let the story of these years of hard work, enterprise and achievement, and of stormier ones that were to come, be briefly told in the pages that follow.

1926 IN NOVEMBER of the previous year, Alan J. Cobham, with his engineer, Arthur Elliott, and a ciné photographer, B.W.G. Emmott, had set off on a leisurely business tour to Cape Town, using a D.H.50 powered by one 385 h.p. Jaguar engine. They reached their destination in February, and then made the return journey of some 16,000 miles in 15 days. Not content with this, between June 30th and October 1st Cobham flew to Melbourne and back, a distance of approximately 24,000 miles, in some 320 flying hours. The same type of aircraft was employed, fitted with floats except over the Darwin-Melbourne stretch, for which wheels were fitted. For this astonishing flight at the age of 32, Cobham was knighted, was awarded the first F.A.I. Gold Medal won by a Briton, and gained his third Britannia Trophy. In these days of four-engined commercial aircraft operating on regular inter-continental schedules it is hard to visualize anyone overcoming the hazards and difficulties of such flights in single-engined aircraft; but it was largely due to Cobham and the other pioneers that many of the world trunk routes were established in the years that followed.

Two of the great pioneers of long-distance air routes: Sir Charles Kingsford-Smith (left) and Sir Alan Cobham.

There were other events in 1926 that are worthy of recording. One was the first public Autogiro demonstration flight outstandingly executed by Frank Courtney at the Hendon Display. Another was the airlift organized by the *Daily Mail* during the General Strike, by means of which the newspaper was distributed by air after being printed in France; the R.A.F. also played an important part in newspaper carriage. A third was the return to London from Paris of H.R.H. the Prince of Wales in an Imperial Airways Handley Page W.8B—the first time a member of the Royal Family had travelled on an airline. The Prince is reported to have sat, for the greater part of the trip, alongside the pilot, Capt. O. P. Jones; he always showed a keen interest in air affairs.

1927 LONG-DISTANCE flights continued to be undertaken. Sir Alan Cobham and Capt. H. V. Worral carried out a 20,000-mile survey flight to South Africa in a Short Singapore flying boat (two Rolls-Royce Condors). The name Kingsford-Smith began to appear in newspaper headlines. And F/Ls. Carr and Gillman had a shot at the distance record, which they missed by a narrow margin when their single-engined Hawker Horsley was forced to descend in the Persian Gulf after covering 3,485 miles non-stop.

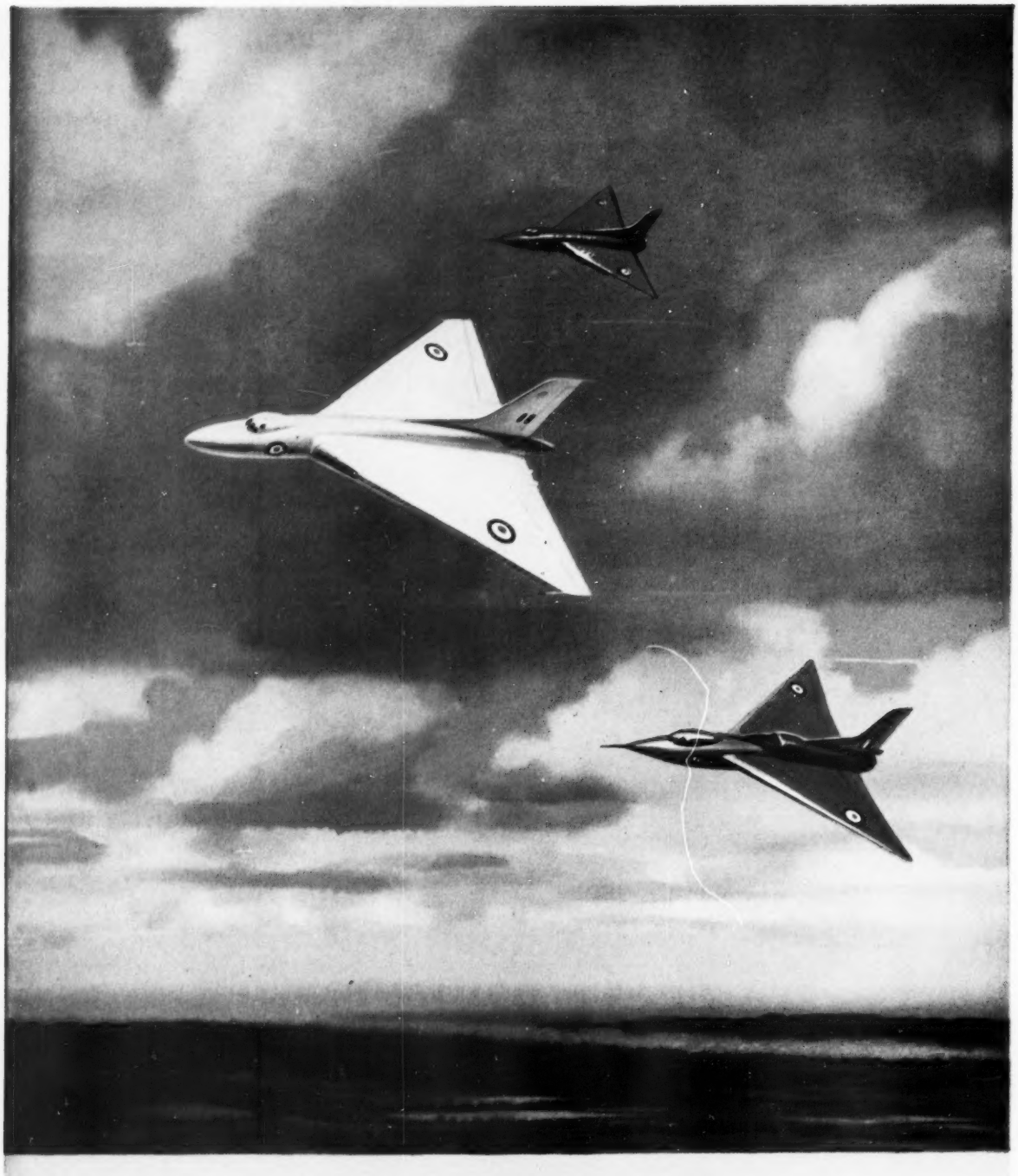
The year also saw Great Britain win the Schneider Trophy for the third time, victories having been previously obtained in 1914 and 1922. The aircraft was a Supermarine S.5 fitted with a geared Napier Lion engine of 900 h.p., and flown by F/L S. N. Webster. F/L. Worsley was second in a similar aircraft with ungeared engine. The speed of the winning aircraft on this occasion was 281.5 m.p.h.

1928 STILL MORE epic long-distance flights took place in this year. Charles Kingsford-Smith, accompanied by a fellow Australian, C. P. Ulm, and two Americans, Lyon and Warner, took off from Oakland, California, on May 31st in the trimotor Fokker *Southern Cross*, and on June 9th arrived in Brisbane, Australia, *via* Honolulu and Fiji—thus accomplishing the first South Pacific crossing (a "25th anniversary" account of their adventures appeared in *Flight* last week).

Another Australian, Bert Hinkler, made a solo flight from London to Darwin in Australia in an Avro Avian powered by an 80 h.p. Cirrus engine—a feat which won him the Britannia Trophy and an F.A.I. Gold Medal. He covered the 11,000 miles in 15 days. Later in the year Lady Bailey, who had learned to fly in late middle age, took a Cirrus-Moth solo to the Cape *via* Johannesburg, and then back *via* the West Coast—a route hitherto unflown. The round trip finished in 1929, and she was awarded the Britannia Trophy for that year—the first occasion on which it had been won by a woman.

Lady Heath also made a solo flight from the Cape to London during the early part of 1928, using an Avro Avian, and Kingsford-Smith made the first crossing of the notorious Tasman Sea in his *Southern Cross*. Finally, four R.A.F. Supermarine Southampton

OUR LOYAL
GREETINGS
ROTOL & BRITISH MESSIER
GLOUCESTER ENGLAND



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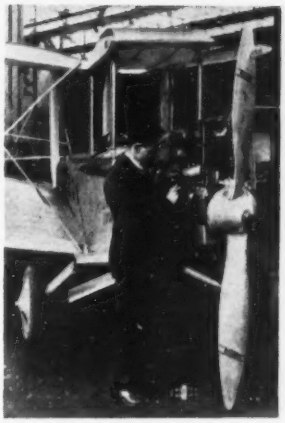
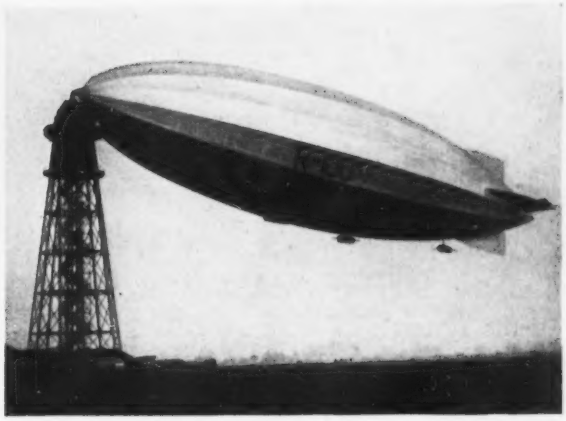


(*Left*) *Bert Hinkler beside the Avro Avian in which he made the first solo flight to Australia (1928).*



(*Right*) *The airship R-100 made a variety of successful flights, including one to Montreal and back (1930).*
"Flight" photographs

In the Queen's Lifetime . . .

flying-boats made a joint flight to Australia, thus pioneering the later flying-boat route.

Such were the outstanding factual achievements, but the most important of all was just a thought, the mere glimmering of an idea : it was in 1928 that one Frank Whittle, a cadet at Cranwell, began a serious study of the possibility of gas turbines for aircraft.

1929 ONCE AGAIN there were important long-distance flights, notably that of Kingsford-Smith from Australia to the United Kingdom in 13 days. But, even more important, great developments were afoot in scheduled services. Five years earlier, in 1924, British civil aviation had shown that it had really come to stay: Imperial Airways had been formed from four smaller companies, and the following year Brancker and Cobham had made their historic survey flight to India; in 1926 a regular service had opened between Cairo and Basra, *via* Baghdad (in spite of some of the night stops having to be safeguarded from marauding tribesmen), three-engined D. H. Hercules aircraft being employed; and in 1929 it at last became possible to reach an agreement with the Persian government, who had hitherto proved obstructive, so that the full route to India could be opened. Passengers flew to Basle, went by train to Genoa, then on to Alexandria by Calcutta flying-boat, and finally from Cairo to Karachi by Hercules. India was only one week distant from London, instead of three. It may be appropriate here to say that the Persian part of the route was later re-routed through Arabia; that by 1933 a passenger could book as far as Calcutta, Rangoon and Singapore; and that in 1934 Qantas Empire Airways, Ltd., was formed to operate in co-operation with Imperial from Singapore to Brisbane. The 12,700-mile route was, even in those days, flown regularly in 12 days. Later on, the Qantas part of the route was extended to Sydney.

There were successes of other kinds in 1929, too. The Schneider Trophy was won again, this time by F/L H. R. D. Waghorn at 328.63 m.p.h. The aircraft was a Supermarine S.6 designed by R. J. Mitchell and powered by a Rolls-Royce "R" engine which produced no less than 1,900 h.p. for a weight of only 1,350 lb. Those who decry the value of racing and records surely overlook the fact that the Spitfire and the Merlin were the direct results of the design and research brought about by these Schneider Trophy events. A few days after the winning of the Trophy S/L A. H. Orlebar raised the world speed record to 357.72 m.p.h. on the same aircraft.

Apart from long-distance and high-speed achievements, the year also saw the introduction of the de Havilland Puss Moth, a high-wing light aeroplane with an enclosed cockpit; the formation of the British Gliding Association; and the launching of the two great British airships, R-100 and R-101, which subsequently made successful flights over London.

1930 THIS YEAR saw the name of Amy Johnson rise to prominence. She bought a second-hand Gipsy Moth, which she christened *Jason*, and started eastwards on May 5th with an 800-mile hop to Vienna. Before reaching Karachi she had become world-famous. There was a taxying accident at Insein, just short of Rangoon, but she reached Darwin 19½ days after leaving England—truly an epic performance. In the same year Kingsford-Smith made a crossing of the North Atlantic from Ireland to Newfoundland in the *Southern Cross*, and lowered the Heston to Darwin record to just under 9 days 22 hours in an Avro Avian. Capt. C. D. Barnard, B. Little and the Duchess of Bedford made a return journey to Cape Town in less than three weeks, using a Jupiter-engined Fokker. And Mrs. Victor Bruce set out on a remarkable flight (completed in 1931) in a Blackburn Bluebird. She started from Croydon after only 40 hours' solo, and flew all the way to Japan, and thence returned to England *via* America, crossing the oceans by boat but America itself in her aircraft.

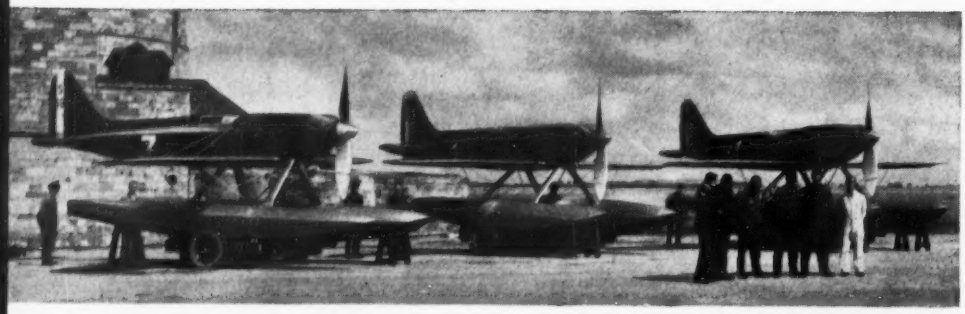
Airships made headline news for, virtually, the last time. The R-100—much the better of the two great new vessels—made a successful Atlantic crossing to Montreal and back, but disaster overtook the R-101, which had not proved an entirely satisfactory ship. The great vessel left Cardington on October 4th with India as destination. Early the next morning, in a storm, she struck a hill near Beauvais in France, killing all but six of those on board. Amongst the dead were Lord Thomson himself, and the irreplaceable Director of Civil Aviation, Sir Sefton Brancker, who had done more for non-military flying in this country than any one man before or since. The cause of the disaster may have been chafing of the gas bags, as stated in the official findings—or, according to other opinions, ice accretion on the envelope: but, whatever it was, it finally put paid to airship work in England.

1931 LONG-DISTANCE flights continued, with many of the now famous names to the fore, and a new one added, that of James A. Mollison, who made flights in Gipsy and Puss Moths from Australia to England (just under nine days), England to Cape Town (4 days, 17½ hours), and Dublin to New Brunswick (30¾ hours). During one of the intervals between flights he and Amy Johnson became man and wife.

In the sphere of commercial aviation, 1931 saw the introduction of the Imperial Airways service from London to Mwanza, on Lake Victoria in Africa; and in the following year the route was extended to Cape Town. On the Cairo to Kisumu stage

(*Below*) *The Houston-Westland Special, one of the two aircraft which participated in the spectacular overflying of Mount Everest (1933).*

(*Right*) *More pioneers: Jean Batten, and Amy and Jim Mollison.*
"Flight" photograph



The last of the British Schneider Cup teams, with their Supermarine seaplanes, at Calshot in 1931. The two outer aircraft are S.6Bs built for that year's race, while the centre one is an S.6A, one of the machines first used in the 1929 contest.
"Flight" photograph

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of the new route, the equally new four-engined H.P.42s were introduced—aircraft destined to become famous. Eight were ordered in all, four for European and four for Empire routes, and when war came in 1939 six of them were still flying, each having covered more than a million miles without causing injury to a single person. The aircraft were well ahead of their time, carrying up to 42 passengers in two saloons, and possessing a kitchen capable of serving seven-course meals. Effective heating and soundproofing systems were two other revolutionary features.

By the end of 1931, as a result of operations on the Indian and African routes, Imperial Airways had amassed a fund of "know-how" which was to become the foundation of the international air routes of today. They were well ahead of their competitors. Only for them did Lloyds reduce the premium rate for air travel to the figure that applied to surface movement.

The last Schneider Trophy competition took place in September 1931. The Italians and French dropped out at the last moment, and the Trophy was won, unopposed, for Great Britain for the third successive time by F/L. J. N. Boothman (now Air Marshal Sir John Boothman, K.B.E., C.B., D.F.C., A.F.C.) on the S.6B (2,300 h.p. Rolls-Royce R engine). This was not such a "walk-over" as might be supposed, for the £100,000 necessary to finance the preparations had been put up, not by the Government, but by Lady Houston, widow of the millionaire shipowner, only nine months before the contest. Boothman achieved only 340.08 m.p.h., due to very bad flying conditions, but a fortnight later F/L. G. H. Stainforth raised the world speed record to 407.5 m.p.h. in the same aircraft.

1932 THE MOST notable British distance flight in this year was that of Mollison, who achieved the difficult east-west Atlantic crossing in a Puss Moth (120 h.p. Gipsy engine). Other fine efforts were made by Mrs. Mollison and C. W. A. Scott, both using Moths. A particularly interesting performance, however, was that of C. F. Uwins, who gained the aeroplane world altitude record for Great Britain for the first time, using a Vickers Vespa biplane fitted with a Bristol Pegasus engine. Wearing electrically heated clothing, but in an aircraft without any form of pressurization, he reached a height of 43,976ft—a remarkable feat.

A significant development in the industry was the beginning of the long association between Fred Miles and Phillips and Powis, Ltd., who between them turned out so many excellent light aircraft during the pre-war period.

Finally, it was in 1932 that Sir Alan Cobham started flight-refuelling experiments with two D.H.9s. Work continued apace, and by 1939 two modified Short Empire flying-boats, *Caribou* and *Cabot*, had carried out regular non-stop Atlantic crossings between Foynes and Botwood, using equipment developed by Fight Refuelling, Ltd., of which Sir Alan was, and still is, managing director.

1933 THIS WAS the year of the Mount Everest air expedition, made possible like the last Schneider Trophy Race, by the generous backing of Lady Houston. Two aircraft were used, one the Houston-Westland special, the other a stripped Westland Wallace. The pilots were Lord Clydesdale and F/L. McIntyre, and Col. Blacker, Mr. Bonnett and Mr. A. L. Fisher acted as observers and photographers. Both aircraft were powered by Pegasus engines. Two highly successful sorties were made over the "target" and surrounding peaks, the second in defiance of orders from home, and a magnificent series of photographs were obtained.

Another notable achievement was the gaining of the world distance record by S/L. O. R. Gayford and F/L. G. E. Nicholetts in a special Fairey long-range monoplane (Napier Lion). They flew from Cranwell to Walvis Bay, just short of Cape Town, a distance of 5,341 miles, in 57½ hours. A further fine long-distance flight was made by the Mollisons, who flew from Pendine Sands in Wales to Bridgeport, U.S.A. in a D.H. Dragon.

At home, the first S.B.A.C. show was held at Hendon on the Monday following the R.A.F. Pageant, to give overseas official and other visitors the opportunity to inspect more closely the aircraft which had performed so outstandingly the previous day.

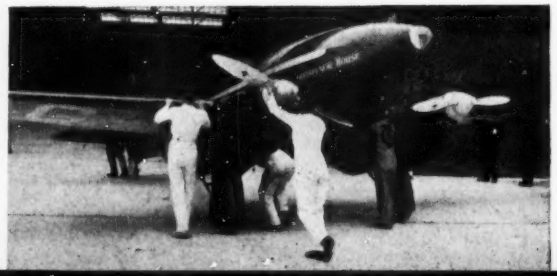
1934 THIS YEAR saw Jean Batten, the New Zealand girl, fly a Moth from England to Australia in just under 15 days, but perhaps the greatest excitement was caused by the MacPherson Robertson race, which was held in October over the Mildenhall-Melbourne route. De Havillands produced a special design for the event, the original Comet (two Gipsy Sixes), with features that were to be reflected as a family resemblance in the later Mosquito. Three Comets were built, and the crews of all did magnificently. The Mollisons flew non-stop to Baghdad, thence on to Karachi, and seemed unbeatable—then they had undercarriage trouble, and had to retire. Cathcart-Jones and Ken Waller finished fourth. C. W. A. Scott and Tom Campbell-Black won, in spite of the fact that they had to fly for many hours on one engine. Their time was 71 hours, a very fine performance, for which they received the Britannia Trophy and an F.A.I. Gold Medal. One cannot help wondering what will be the winner's time in this year's New Zealand race.

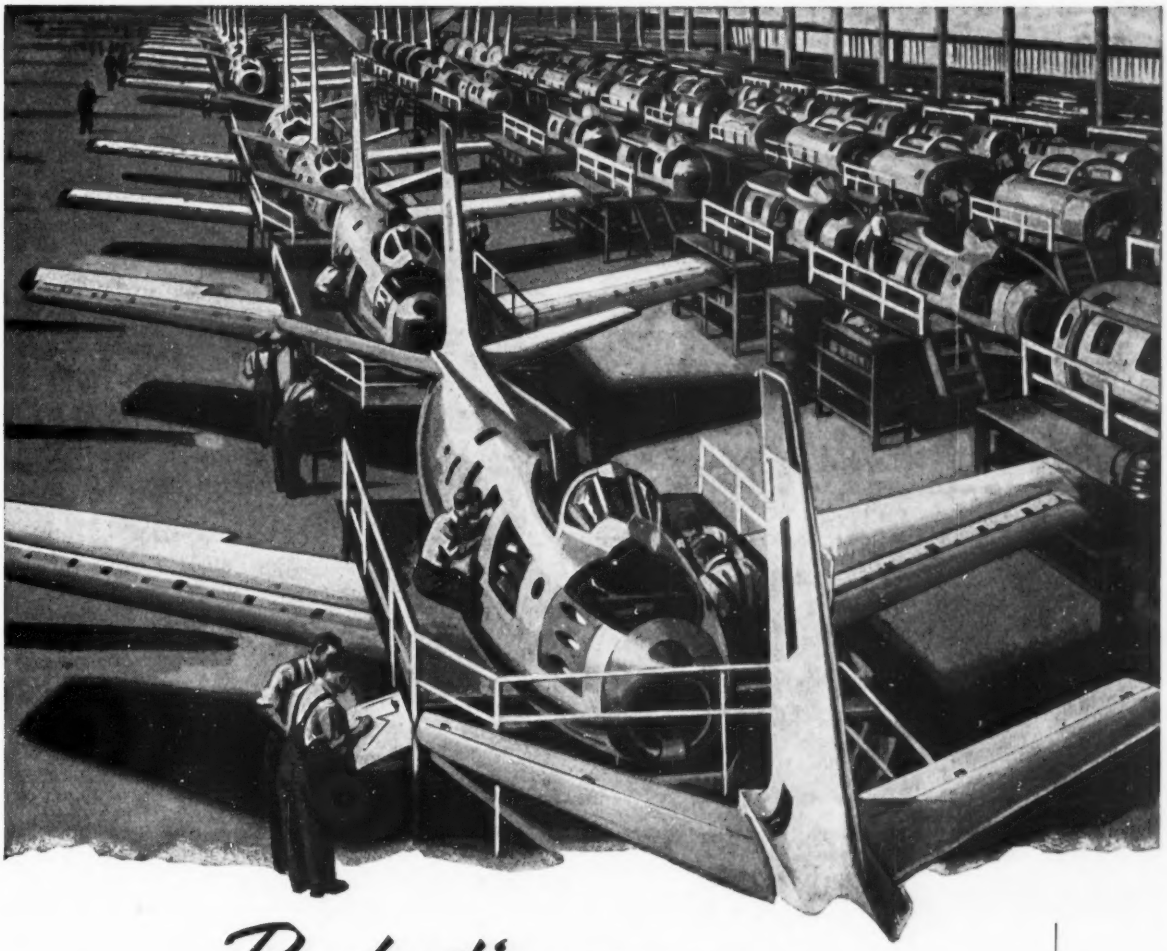
The year 1934 was an epic one for Imperial Airways, for it was then that the decision was made to operate the Empire air-mail scheme. This sweeping and unprecedented plan embodied the automatic carrying by air of nearly all Empire mail at a flat rate of 1½d. It made it necessary to lay down a large fleet of modern aircraft, and 29 Short "C" class flying-boats were ordered "off the drawing board" by George Woods-Humphery, Imperial Airways' managing director. Such an order was also quite unprecedented in its day, but faith was justified—the "C" class boats were supremely successful, and fathered a whole series of civil derivatives, and also the R.A.F.'s Sunderlands. The Empire boats, as they came to be called, were designed by Arthur Gouge, and carried 24 passengers in considerable comfort at a cruising speed of 145 m.p.h. The first of them was launched in 1936, and by the end of 1938, with their aid, the full air-mail scheme was in operation throughout the Empire.

1935 FOR SOME years past, a few voices in the political wilderness had been raised in warning about Hitler and his intentions, but few had heeded them. By the previous year, however, the threat could no longer be denied, and a serious effort at rearmament had been initiated. Now, in 1935, the planning was beginning to have visible effect.

Thirteen civil flying schools were approved to give *ab initio* instruction to the pilots joining the expanding Air Force—the first of those same schools, incidentally, which are today being closed down. Eighteen types of military aircraft were being built by the end of the year—too many types, and too few of each (although it is easy to be wise after the event). The first Hurricane appeared, designed by Sydney Camm—an aircraft destined to play the major rôle in winning the Battle of Britain. The first highly-secret conference on radar was held, without which that

(Left) Hannibal, one of the famous H.P.42s, with which Imperial Airways operated Empire services before the war. (Right) The original de Havilland Comet, in which C. W. A. Scott and T. Campbell Black won the England-Australia Air Race (1934).





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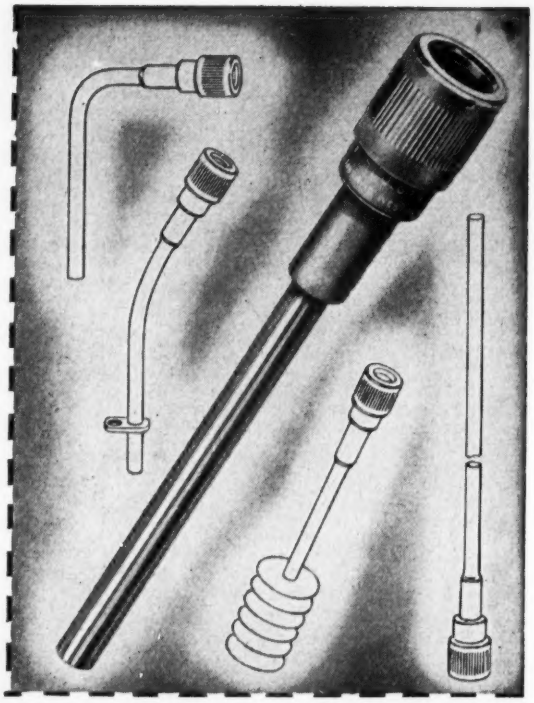

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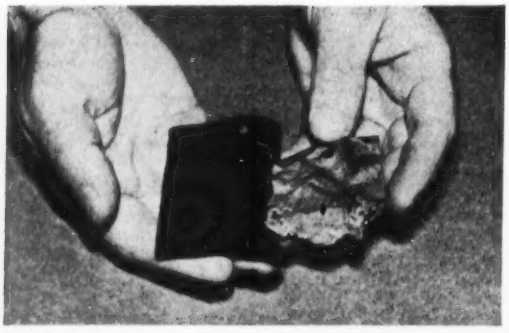
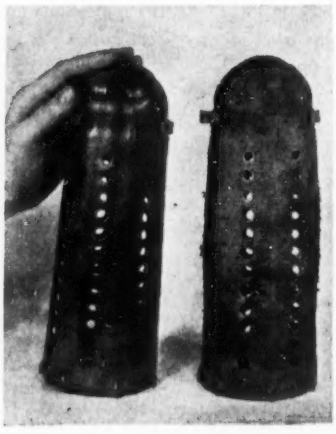


This is a dramatic example of the protection afforded by the Solaramic process against jet engine temperatures. Two thin samples of AISI type 321 stainless steel were tested at 1,850° F. The piece on the left, Solaramic coated, is shown after 150 hours of testing; the uncoated sample on the right was virtually destroyed by oxidation after only 20 hours. The samples are of .002-in. sheet the same thickness used in making jet tube insulating blankets. After Solaramic coating these thin sheets can be bent and crinkled repeatedly without fracturing the coating, one of the unusual qualities of the Solaramic process.



These combustion chamber liners are made of type 321 stainless steel. They were tested through cycles of 15 minutes at 1,900° F followed by 15 minutes cooling in air for a total period of 20 hours. The Solaramic coated liner on the left is in good condition, whilst the uncoated liner is severely distorted and badly oxidised.

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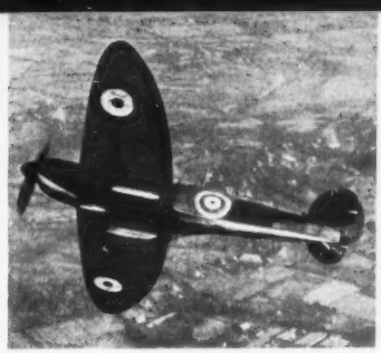

"Flight" photographs

(Left) The Hurricane and Spitfire prototype, whose descendants were destined to save the day in the summer of 1940. (Right) The Bristol 142, "Britain First": capable of 280 m.p.h., this private-venture aircraft was presented by Lord Rothermere to the Air Ministry and was the forerunner of the famous Blenheim bomber (1935).

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battle would almost certainly have been lost; and Robert Watson-Watt gathered together a team to start practical research in the matter.

The "jump-start" Autogiro made vertical take-offs. Jean Batten flew from Australia to England in a Moth, and later from England to Brazil in a Percival Gull. British Airways was formed from three smaller companies, providing competition for Imperial on the European routes.

1936 SINCE UWINS had captured the altitude record in 1932 it had passed to the French (twice) and to the Italians, but 1936 saw it regained for Great Britain by S/L. F. R. D. Swain on the specially built Bristol 138 monoplane with Pegasus engine. He reached 49,943ft. The cabin was again not pressurized, but Swain wore what might today be called a "space-suit" that permitted him to breathe oxygen under pressure: the device worked well on the way up, but on the descent he eventually had to slash it open at 14,000ft to prevent himself suffocating.

In September there was an air race from Portsmouth to Johannesburg: the event was not an entire success, and only one machine finished—the Vega Gull flown by C. W. A. Scott and Giles Guthrie. Other fine long-distance flights were made by, among others, F/L. Tommy Rose in a Miles Falcon (to the Cape and back), and by Jean Batten, who made the England-New Zealand journey in just over 11 days in a Percival Gull, thus gaining the Britannia Trophy for the second successive year.

There were numerous other important events in the year. The first Spitfire flew, driven by a Merlin of 1,050 h.p. at a top speed of some 360 m.p.h. (By the end of the war, Spitfires were capable of 450 m.p.h. under the urge of 2,040 h.p.) The A.R.B. was formed, and Lord Swinton, the Air Minister, announced the creation of the R.A.F.V.R. and of the shadow factory scheme. The Observer Corps started to function. Finally, the R.A.F. itself was re-organized into four Commands, Bomber, Fighter, Coastal and Training, instead of the two that had previously existed.

1937 THE ITALIANS captured Swain's altitude record at the beginning of the year, but F/L. M. J. Adam quickly regained it for Britain in the Bristol 138 at 53,936ft. F/O. A. E. Clouston, by then already well known to the world, won the Britannia Trophy for a series of flights in a Comet. The Admiralty gained complete control over the Fleet Air Arm. The last of the famous Hendon Air Pageants—by that time known as the R.A.F. Displays—took place (though one more was to be held, at Farnborough, after the war). And Whittle's first jet engine, with single combustion chamber, ran for the first time. A year later, re-designed with multiple combustion chamber, the machine was running up to 17,000 r.p.m. The Air Ministry at last became interested, and George Carter at Glosters was asked to design an aircraft to take a gas turbine. Thus was born the E.28/39, of which more anon. Nine years of endeavour and discouragement had culminated in success for the brilliant and persevering inventor.

1938 OUTSTANDING FEAT of this year was the regaining of the distance-record, which since 1933 had passed to France and then to Russia. Three Vickers Wellesleys (single Pegasus engines) set out from Ismailia, Egypt, and two of them reached Darwin non-stop, a distance of 7,158 miles. The pilots were S/L. R. Kellett and F/L. A. N. Combe. The performance proved the value of B. N. Wallis' geodetic construction, which made possible the later Wellington bomber, famous for its ability to take punishment.

Sir Frank Spriggs put in hand the manufacture of 1,000 Hurricanes, although the official order was for only 100, and there is little doubt that this far-sightedness must have had a profound, if not decisive, effect on the Battle of Britain. A Hurricane already in service made headline news, when it flew from Turnhouse to Northolt at an average speed of 409 m.p.h. in the hands of S/L. J. W. Gillan.

In February the first separation of the Short-Mayo composite aircraft (illustrated on page 702) was successfully effected, with Lankester Parker and Piper at the controls of *Maia* and *Mercury* respectively. Later *Mercury* made some fine flights, notably to Montreal, and also to South Africa, in the hands of Capt. D. C. T. Bennett of Imperial Airways. This particular form of assisted take-off was somewhat overtaken by events, however, and was never developed further. None the less, it did permit the first commercial return flight over the North Atlantic by a heavier-than-air machine, and—in spite of numerous experimental proving flights—only *Cabot* and *Caribou*, the two flight-refuelled boats, were able to emulate the feat before war began. In all cases, only mail was carried. Transatlantic passenger flights did not start till 1940, when the boats *Clare* and *Clyde*, which had been equipped with extra tankage, were used for transporting key personnel.

There were other noteworthy events. Sir Kingsley Wood, that energetic figure, became Air Minister. The Civil Air Guard was formed, and 12,000 men and women were "on the books" by September, 1939. And Imperial Airways took delivery of its first Albatross, one of the most graceful airliners ever built, and far ahead of its time in design.

1939 SAW ALEX HENSHAW gain the Britannia Trophy in recognition of a very plucky flight to the Cape and back in a Percival Mew Gull. He was back at Gravesend four days, ten hours after leaving, so exhausted that he had to be lifted from the cockpit.

But the shadow of strife was now dark over Europe, and soon the achievements of Britain's aeronautical fraternity were to be directed, first to sheer survival, and ultimately to victory. Inevitably, great advances were made in all fields of aviation; but these events are still comparatively fresh in the public mind, so this survey may be concluded with a relatively short sketch of achievements and trends since the outbreak of war in September 1939.

The War Period

IN 1939, as all but our youngest readers will remember, hostilities began with the era of the "phoney war." But there was little sense of stalemate for the R.A.F. The relatively new Blenheims and Wellingtons showed their mettle, and the Battles already proved dangerously obsolescent. The Empire Air Training scheme was launched, and A.T.A. was formed, to do a fine job of work for the rest of the war. Atlantic services were continued in a small way, at first with mail only, but in the following year carrying V.I.P.s and ferry pilots.

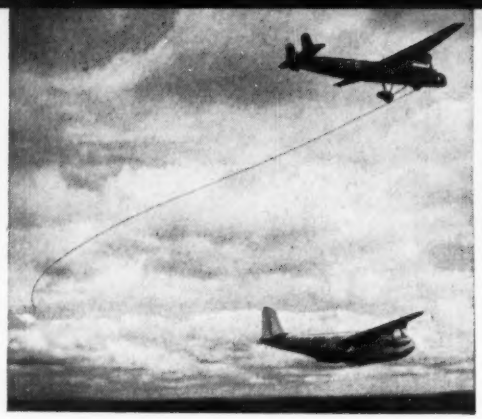
May 1940 saw Fighter Command assisting in the protection of the hard-pressed troops on the beaches of Dunkirk, and in the autumn came the fighter pilots' "finest hour", about which

(Below) One of the Short "C"-class flying-boats, which enabled Imperial Airways to operate the Empire air-mail scheme. (Right) F/L. M. J. Adam wearing the pressure suit which he used when regaining the altitude record in the Bristol 138 monoplane (1937).

"Flight" photographs

"Flight" photographs

Two pre-war approaches to the problem of increasing aircraft range: the Short-Mayo composite aircraft, and flight refuelling from a Harrow tanker.



Alex Henshaw in the cockpit of his record-breaking Mew Gull.

In the Queen's Lifetime . . .

so much has rightly been written that nothing need be added here—save, perhaps, to say that 1,733 enemy aircraft were shot down and 643 damaged, for the loss of 828 fighters and 405 gallant pilots.

Other outstanding events of the year were the Swordfish raid on Taranto, when three Italian battleships were sunk for the loss of two aircraft; the introduction of the British-invented Magnetron valve, which alone made possible all the fantastic array of centimetric radar that made our bombers and night-fighters so effective; and the first delivery flight of Hudsons across the Atlantic. Overshadowed by war news, but an important occurrence nevertheless, was the merging of Imperial and British Airways into British Overseas Airways Corporation, in April.

In 1941, Atlantic ferry flights continued on an increasing scale under the organization known as "Atfero", which in July became R.A.F. Ferry Command under Air Chief Marshal Bowhill. The Mosquito appeared; and No. 151 Hurricane wing went to Murmansk to teach the Russians how to fly and maintain the similar aircraft which they were receiving. The Luftwaffe's night raids on British cities, which had proved such a grim test for the people throughout the winter of 1940–41, became steadily less intensive as defence methods improved—among them A.I., Fighter Control, and the skill of the counter-measures scientists in deflecting the German radio beams. The *Bismarck* was located and sunk, a victory in which Coastal aircraft fitted with A.S.V. played a vital part; and a Hudson of 269 Squadron of the same Command actually "captured" a U-boat off the coast of Iceland.

Bomber Command was busy at Brest and elsewhere. By the end of the year over 500 of the new Stirlings, Halifaxes and Lancasters had been delivered, and 4,000 lb bombs were being used on an increasing scale. Finally, and most significant of all for the future, the first jet flight in Britain took place at Cranwell on May 15th—a historic moment indeed, though one cloaked in the greatest secrecy. F/L. Jerry Sayer was at the controls of the Gloster-Whittle machine, which was airborne for 17 minutes on this momentous occasion.

In 1942 Bomber Command's effort was steadily stepped up under the relentless guidance of "Bomber" Harris. Radar aids —Gee, Oboe and H2S—were introduced, bomb weights went to 8,000 lb, and the Pathfinders were formed under Air Commodore (later A.V.-M.) Bennett—that same Bennett who had crossed the Atlantic in *Mercury* before the war. The first 1,000-bomber raids against Germany took place, with devastating effect because the fires started could not be controlled. Elsewhere, the Desert Air Force, with tank-busting Hurricanes and other famous types of support aircraft, was making its power felt, first in thwarting Rommel's attacks, then by playing a major part in his rout. Tedder and Conningham were the air officers who organized this classic instance of air/ground co-ordination. In the Mediterranean, the siege of gallant Malta was lifted, and the island's airfields were soon packed with aircraft for subsequent operations.

The year 1943 saw increasingly successful air warfare against he U-boats, by V.L.R. (Very Long Range) and other squadrons of Coastal Command, equipped as they were, by then, with H2S, Leigh lights, rocket projectiles, and other aids to destruction. The Möhne and Eder dams were breached by Guy Gibson's hand-picked crews, using the fantastic weapon devised by Wallis (its exact nature is still a well-kept secret). An obliteration attack made on Peenemunde was estimated to have put back Hitler's V.2 attack by at least a year. Gliders were used on a large scale for the first time in the invasion of Sicily, and pilots in Malta used the first R.A.F. G-suits. Transport Command was formed, to take care of the work of Atlantic and all other transportation requirements. In the East, air superiority was firmly established over the Japanese.

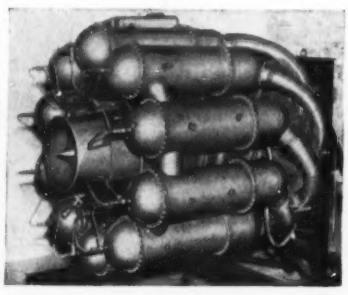
June 1944 saw that dark omen for future wars—the pilotless aircraft—used as a weapon against cities. Over 10,000 V.1s were launched against England by the Germans, in spite of frequent attacks on the launching sites by aircraft of Bomber Command and the 2nd Tactical Air Force. About 7,500 of the missiles reached our coasts, and 52.8 per cent of these were destroyed, a few by balloons, the rest in almost equal shares by guns and fighters. The gunners used radar prediction and the new (American) proximity fuses, Fighter Command their fastest aircraft, included among which were the first Meteors to enter service. Later in the year came the V.2. Fortunately for southern England, the invasion was launched against the enemy in Normandy at the same time as their V.1 attack commenced; this fact, coupled with the Peenemunde raid, saved us from what might have been appalling destruction.

The invasion and subsequent battles saw the employment of Bomber Command and 2nd T.A.F. aircraft on a vast scale, and rocket attacks on armoured vehicles became a great feature, as did the "cab-rank" system of having close support immediately available. By this time aircraft production was up to more than 2,400 aircraft per month, and the 12,000 lb *Tallboy* bomb was beginning to make itself felt, being responsible for holing the "indestructible" U-boat and E-boat shelters in the French ports, destroying viaducts and canals that had defied previous efforts, and capsizing the *Tirpitz*, sister ship to the *Bismarck*, at Tromsö. The year was also marked by the largest airborne infantry operation ever undertaken, the famous attack on Arnhem and Nijmegen.

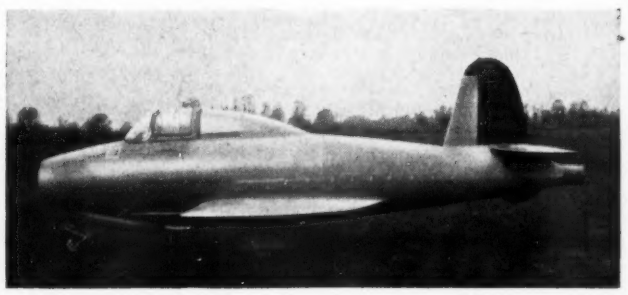
In Burma the successful southwards campaign was begun, in which stores measured in thousands of tons were flown over the "Hump", and an army that was sometimes as large as 100,000 men was supplied from the air by British and American aircraft.

In 1945 the war in Europe ended. Airborne assault had been used with success in crossing the Rhine, and the great 22,000 lb *Grand Slam* bomb which only specially modified Lancasters could carry, had proved to be a weapon of enormous possibilities.

Air power was then transferred to the East. Lincolns were produced for long-range operations against Japan, Transport Command found itself very busy indeed; and then came the Atom Bomb, and the whole concept of modern warfare was changed overnight. Air Marshal Harris' offensive had been the greatest of all the reasons for the defeat of Germany, but it had taken a long time to achieve the necessary destruction and dislocation. The V weapons and the atomic bomb warned mankind



Dawn of an era: Whittle's engine, the Power Jets W.1, which successfully drove the Gloster E.28/39 (seen on right) into the air on May 15th, 1941.



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27th December, 1952.

Dear Sirs,

We have pleasure in bringing to your notice an article which appeared in "The Autocar", as per the attached cutting, about our Austin A.70 Hampshire Saloon, first registered July 1949.

The engine has not been touched, not even decarbonised, and the mileage is now almost 100,000. We have used Castrol XL oil exclusively, and to this, do we attribute the engine's long life without overhaul.

We would also like to point out that we have had four post-war cars that have done over 70,000 miles each without re-bore, and all have been run on Castrol XL oil exclusively.

Yours faithfully,

For METCALFES OF LEYBURN.

R.McC. Metcalfe

UNSOLICITED TESTIMONIAL

From "The Autocar," Dec. 5th

"USED CARS ON THE ROAD" FEATURE

Of all the post-war cars tested in this series none has previously approached a mileage figure of nearly 100,000 and it was for the reason that the Austin A.70 tested had achieved over 96,000 miles so satisfactorily in the hands of the vendors without, it is claimed, the cylinder head even being removed that the car was submitted. The car, which was made available by Metcalfes of Leyburn, Leyburn, Yorkshire, had a clean green exterior with few blemishes on either paintwork or chromium plating. . . .

The main interest in the car was, of course, in finding out how a moderately powered, inexpensive production model had stood up to such a mileage — and the answer was very impressive indeed.

At no engine speed were any extraneous engine or transmission noises heard, and this applied even when the car was revved fairly hard in the indirect gears. In addition to this, m.p.g. was satisfactory and oil consumption was scarcely measurable. A Fram oil filter had been fitted, which undoubtedly affected oil cleanliness; the engine oil was as clean after test as before. At no time during the test was any fussiness noticeable. . . . the car was very lively and covered the ground with ease, rapidity and lack of fuss. Precise speedometer checks were not made because of considerable needle swing but a reading of over an indicated 80 was easily obtained. Although such a mileage cannot necessarily be expected from any comparable car, there was every indication that this engine was good for many more miles without attention to major components. . . .

The general effect produced by the car was that it might have been a carefully maintained example with, perhaps, 20,000 miles or so behind it, and it left the test driver with a great desire to learn in due course what mileage was achieved before major overhaul proved necessary.

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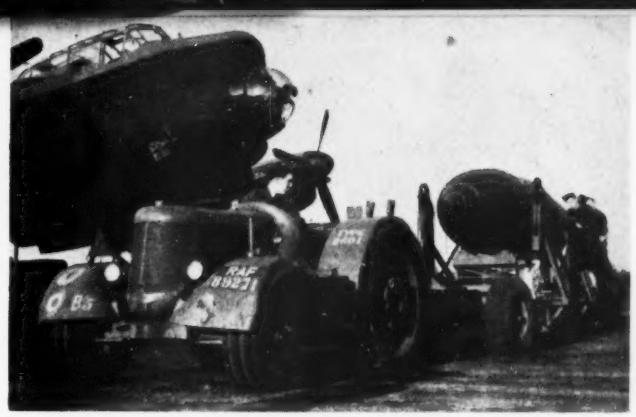
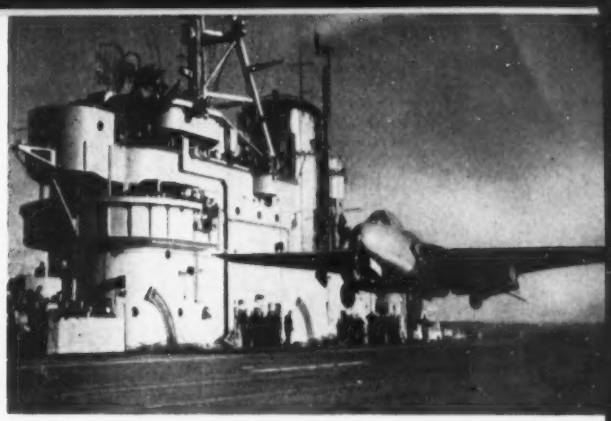




(Above) Lancaster and Grand Slam: Bomber Command's favourite aircraft, and B. N. Wallis's huge bomb, which only the "Lanc" could carry. (Upper right) The very first take-off of a jet aircraft from a carrier: Lt. Cdr. E. M. Brown leaving the flight deck of H.M.S. "Ocean" behind on December 3rd, 1945. (Right) The Trent-Meteor, first aircraft in the world to fly on turboprop power (1945).

In the Queen's Lifetime . . .

that the same results might be obtained "next time" in a matter of days, or even hours. It was a warning that all wise people bear in mind.

The Post-war Period AS IS known only too well to everyone interested in aviation, the years immediately after the war were a difficult time for Great Britain, so closely had our production been geared to purely military affairs. B.O.A.C. and the newly formed B.E.A. and B.S.A.A. (British South American Airways), in particular, were very badly handicapped by lack of suitable aircraft, and eventually the two long-range Corporations were merged and a number of American aircraft purchased to fill the gap.

There were some bright spots, however. We gained the speed record for a time in 1945 and 1946, G/C. H. J. Wilson achieving 606.49 m.p.h. and, later, G/C. E. M. Donaldson 615.78 m.p.h., in specially-prepared Meteors. Geoffrey de Havilland would quite certainly have raised the record still further in the D.H.108 if he had not lost his life while testing that aircraft. John Cunningham wrested the altitude record from Italy in a modified Vampire fitted with a Ghost engine, reaching a height of 59,492ft. *Aries* I (Lancaster) and II (Lincoln) made fine flights over the North Pole and elsewhere. The S.B.A.C. Show was revived, this time at Radlett, and in 1948 was moved to Farnborough, where it has now become a unique occasion in the air year. Fighter Command of the R.A.F. was gradually equipped with Meteors and Vampires as an interim measure, providing a start for the "all jet" programme. During these years, also, some notable British civil aircraft made their appearance, among them the spectacular Bristol Brabazon and Saunders-Roe Princess, the Airspeed Ambassador (now B.E.A.'s *Elizabethan* class), the Handley Page Hermes, and those "best sellers" the de Havilland Dove and the Bristol Freighter.

The really important aspect of those first post-war years, however, was one of forward planning and development—and now, at last, we are beginning to see the results. B.O.A.C. has already operated Comet services for over a year, spanning distance at revolutionary speeds and with perfect regularity. B.E.A. has just started operations with the Viscounts, which are likely to be equally successful. Production of the Britannia is coming along. Orders for our turbine-powered transport aircraft have already grown to unprecedented size. On the Service side, Canberras have changed the whole concept of bomber operations, and carried out a series of outstanding flights, notably those of W/C. R. P. Beamont and his crew, who crossed the Atlantic twice in one day, and F/L. Dick Whittington, who made the trip from London to Darwin in 22 hours. The V-bombers are already in production, and in due course will still further revolutionize the work of Bomber Command, just as the Hunter, Swift and Javelin will call for entirely new techniques from Fighter Command.

In the sphere of freighting, the Berlin Airlift achieved a great cold-war victory, the Americans and ourselves together delivering over 2,000,000 tons of supplies to the city in 277,728 sorties between June 26th, 1948, and October 6th, 1949. Other successes have been obtained in the development of British helicopters for both civil and military purposes; in the production of the huge Blackburn and General Aircraft Beverley, which seems destined for a fruitful career; and by the remarkable results that have been obtained by Silver City Airways in ferrying cars across the Channel, an entirely new departure. Most recent of individual achievements is the climb to 63,668ft—subject to confirmation, an aeroplane world height record—by W/C. W. F. Gibb in the Olympus-Canberra on May 4th.

In this Coronation Year of 1953, therefore, the path of British aviation shines clearer and brighter ahead than it has ever done in the past. Native invention and production, coupled with the efforts of the pioneers of the past, have provided the opportunity. Let us hope for years of peace in which to reap the benefits.

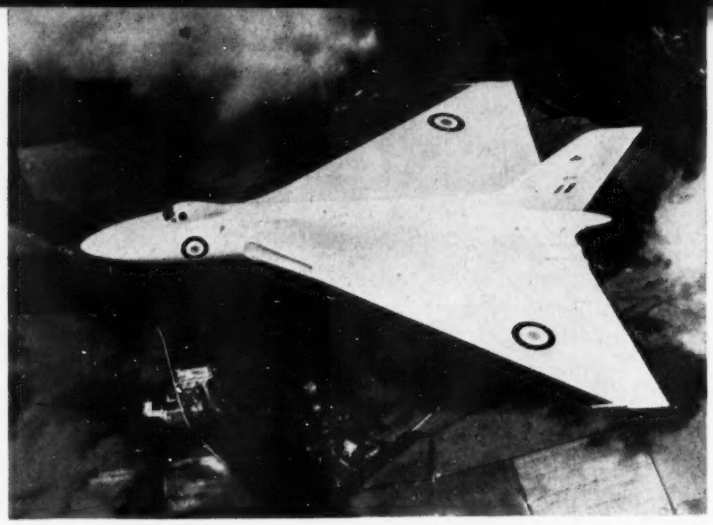
D.I.C.

This modern age: Youth's enthusiasm for flying in the jet era is symbolized in this picture of tree-borne boys watching a Comet land at Hatfield after a record-breaking journey from Copenhagen. The Comet and the Viscount together have placed Britain in the forefront of present-day civil aviation.

THE QUEEN'S AIR FORCES . . .

FOR THE FUTURE

Types of Aircraft on Order but Not Yet in Service



Avro Vulcan B.1.

FIGHTERS

In super-priority production for the R.A.F. are the Hawker Hunter F.1 and F.2, respectively with Rolls-Royce Avon and Armstrong Siddeley Sapphire; the Vickers-Supermarine Swift F.1 (Rolls-Royce Avon); and the delta-wing Gloster Javelin F(AW)1 all-weather two-seater, with two Sapphires.

BOMBERS

The first of the new four-jet "V-bombers" to go into service will be the Vickers-Armstrongs Valiant B.1 (Rolls-Royce Avons). It will be followed by the Avro Vulcan B.1 (four "two-spool" Bristol Olympus), and the Handley Page Victor B.1 (four Armstrong Siddeley Sapphires). The Vulcan depicted is the Avon-powered prototype.

TRANSPORTS

Two contrasting types of transport ordered for the R.A.F. are the piston-engined Blackburn Beverley (four Bristol Centaurus engines), and the high-speed, pure-jet Vickers Type 1000 with four Rolls-Royce Conways. The Beverley is a development of the G.A.L.60, depicted. The Type 1000 is illustrated by a model.

TRAINERS

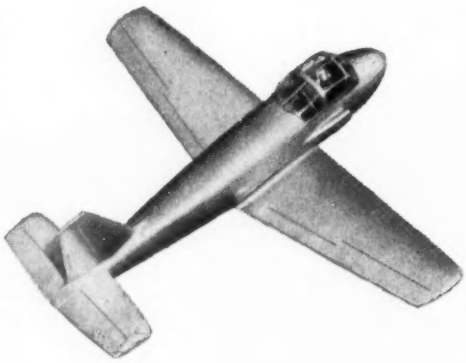
An order has been placed for a development of the Percival Provost piston-engined trainer powered with an Armstrong Siddeley Viper turbojet and illustrated in model form. The Percival company is also building Pembrokes for the R.A.F. The Pembroke is a development of the Prince.

NAVAL

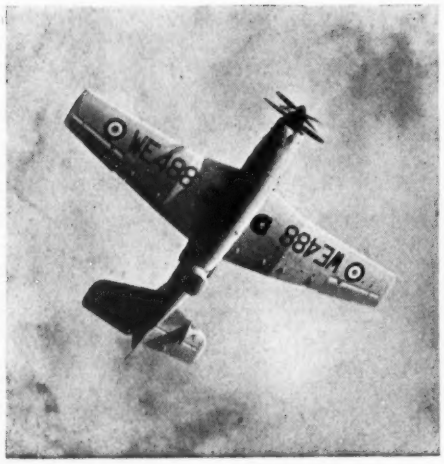
Super-priority rating has been accorded both the Fairey Gannet anti-submarine aircraft (Armstrong Siddeley Double Mamba turbo-prop) and a development of the Vickers-Supermarine Type 508 (two Rolls-Royce Avons). The 508 development is believed to have swept wings.

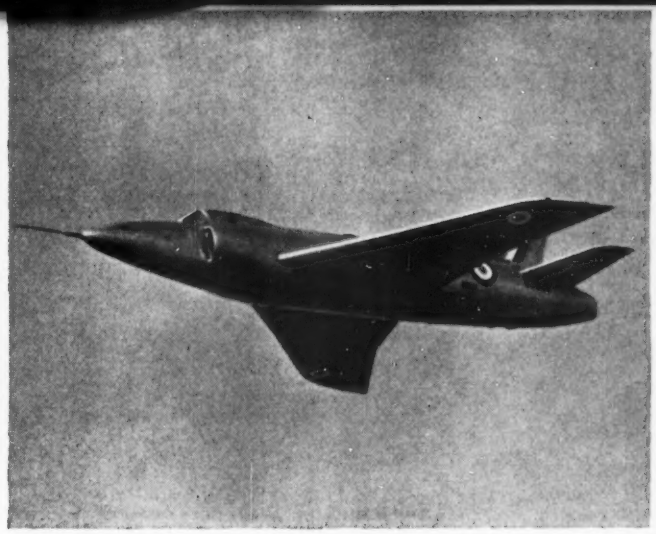
Hawker Hunter F.1s and F.2 (centre)

Percival jet trainer.



Fairey Gannet A.S.1.

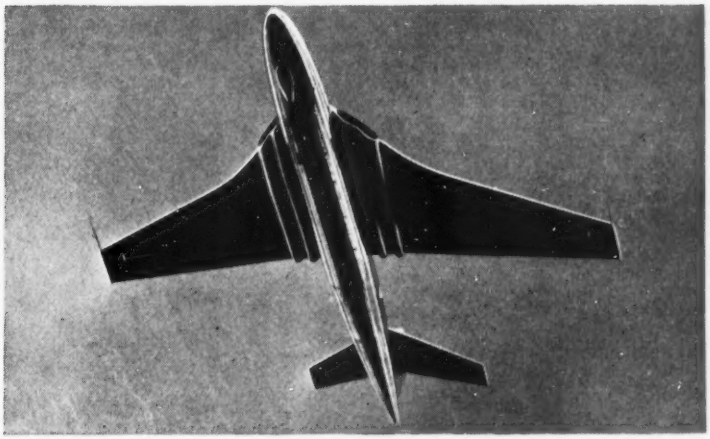




Vickers-Supermarine Swift F.1.

Gloster Javelin F(AW)1.

Handley Page Victor B.1.



Vickers-Armstrongs Valiant B.1.

Vickers Type 1000.

Left: Vickers-Supermarine Type 508.

Blackburn G.A.L.60 (prototype of Beverley).

WHIT-MONDAY'S AIR DISPLAYS

Weather Interferes at Birmingham and Leeds : White Waltham Escapes

At Elmdon: A Firefly of 1833 R.N.V.R. squadron; in the background, the well-designed terminal building, as Capt. Theilmann shows off the S-51.

FOR its air display on Whit Monday, Elmdon (Birmingham's airport) was midway between Yeadon (Leeds) and White Waltham meteorologically as well as geographically : whereas the weather brought the northern event to a standstill at half-time, while the Home Counties airfield had sunshine from start to finish, Elmdon managed to complete its programme, albeit in the face of a menacing thundercloud on the very boundary of the airport, and a heavy rain shower.

To begin with, however, the day was fine and warm, and as *Flight's* Gemini landed and taxied up to Elmdon's pleasing terminal building shortly before lunch, the thunderstorm forecasts seemed very remote. During the morning, several of the afternoon's performers had made practice passes over the field and, for the benefit of those Midlanders making a full-day outing to the airport, these aircraft had been capably described over the loudspeaker system by Mr. Allan Brothers, of the *Birmingham Post*, one of the display's two commentators.

The problem of staging an air display without interfering with the scheduled movements of airliners had been solved by including these movements as items on the programme. Thus it was that, at 2.25, B.E.A.'s Belfast-bound Pionair, as item No. 1, was the object of attention from some 50,000 pairs of eyes—in the glare of which unaccustomed publicity it behaved very well. At 2.30 the display was officially opened by Sir Miles Thomas, D.F.C., chairman of B.O.A.C., who was introduced by Lord Iliffe, G.B.E., chairman of Birmingham Post and Mail, Ltd. (The display, first event in the city's Coronation celebrations, had been organized by the *Birmingham Mail*, in conjunction with the Midland Aero Club.) Sir Miles spoke of the vast increase in the business of air transport and the contribution made by the Midlands to Britain's aircraft industry, and promised that he and his colleagues in B.E.A. and the M.C.A. were determined to give Birmingham an even greater frequency of scheduled services in the future.

A sonic bang then announced the arrival of the U.S.A.F., in two Sabres which went on to give a brief low-level exhibition before landing. Next, two Chipmunks (of Birmingham University Air Squadron) accelerated towards each other from opposite ends of the same runway, and went on to give a neat display of synchronized loops, rolls and other aerobatics. Possibly the most impressive group aerobatics, however, were those next performed by four Meteors of 609 (West Riding) Squadron, R.Aux.A.F., whose tightly-laced loops and climbing rolls were a subtle pleasure to watch. At a somewhat lower speed, Mr. "Chuck" Thompson (of the Midland Aero Club) then traversed the airfield in an inverted position, suspended by his feet from a rope-ladder beneath one of the club's Austers, and then came to earth the direct way by means of a parachute drop. Meanwhile, later comers further delayed by traffic jams were making hedgerow penetrations, swelling the crowd to something like 75,000.

Eight more Sabres of the U.S.A.F. were now due : Flying Control heard that they had the field in view and were beginning a run in. Silence for 30 seconds was followed by an apologetic R.T. message from "Sabre Leader" : "Sorry, wrong field." The right field was quickly located, and smoky trails in the distance heralded two precise formation runs, and an unexpected and exhilarating follow-the-leader low-level pass. An exhibition of the capabilities of the S-51 helicopter by Capt. John Theilmann of B.E.A. was followed by a delayed parachute descent by Mr. Thompson and contrasting performances from a Meteor N.F.11 and a Coastal Command Sunderland. Capt. Theilmann, incidentally, is shortly emigrating to Canada, where he is to fly Bell helicopters for Spartan Air Services of Ottawa.

By this time a sharp breeze had sprung up with the approach of thunderstorm weather, and it was in extremely gusty conditions

At White Waltham : (Below) The attractive appearance of this Short Scion, which flew from Croydon, belies its 16 years. (Below, right) R. A. Mann's beautifully finished J.A.P.-powered Heath Parasol. (Right) Visitors from Beauvais: the two Jodel Bébés flown to the display by Andre Rubichon and Georges Crucifix. "Flight" photographs

"Flight" photographs

(Left) American visitors to Elmdon banged on the sonic door before entering the circuit. Sabre pilots Captains R. P. Murray (left) and A. P. Ashcraft, with their machines. (Right) Rocket-assisted take-offs by two Seafires of 1833 squadron formed part of the Elmdon programme. Here the first of the two gets its initial "push in the back."

that Ranald Porteous gave us his polished Auster aerobatics. The fastest, noisiest thing in the show was the impression then made by a D.H. Venom, in a Farnborough-style series of low passes and solo aerobatics, which was followed by a more restrained demonstration by Fireflies and Seafires of 1833 R.N.V.R. Squadron.

Three Shackletons preceded four Canberras in formation and solo displays, and then it began to rain as Prince Cantacuzene took off—as good a reason as any, one supposed, for his inverted flying. The Prince's incomparable display was followed by a demonstration of attack and defence by Vampires of 605 (County of Warwick) Squadron, R.Aux.A.F., and anti-aircraft units of 2605 Squadron, R.Aux.A.F. Regiment. A full programme was completed by a "pupil and instructor" act in two Chipmunks by C.F.S. pilots, and a fly-past by more Sabres, this time from the R.C.A.F. at North Luffenham.

YEADON UNDER THE WEATHER

AS noted above, Yeadon Airfield, near Leeds, was the only one of the three venues to incur the full displeasure of the elements, though the crowd of nearly 100,000 people were at least granted 90 minutes or so of varied events—a modified programme —before the threatening storm broke. It was hard luck on the sponsors, the *Yorkshire Evening News*. The beneficiaries, were the Soldiers', Sailors' and Airmen's Families Association, and Air Chief Marshal Sir Philip Joubert, the S.S.A.F.A.'s director of appeals, was in charge of the organization.

Parachutist Phyllis Weir opened the programme at 2 p.m. with a drop from an Auster flying at what looked rather less than the 1,500ft announced. In a gusty 20 kt wind she had a rather pendulum-like downcoming, but nevertheless alighted gracefully.

That consistent aerobatic demonstrator Ranald Porteus then showed off his Auster Aiglet, and his contribution was followed by that of Gerard Smith in a Slingsby Sky sailplane : a stimulating show with some loops and vertical turns at notably low speed, ending in a beat-up in which the wings could be seen flexing with a high-speed shuddering motion.

There was nothing particularly remarkable about the formation flying by three U.S.A.F. B-50s—until one of them suddenly appeared at, literally, ten feet above the runway. Next it was Canada's turn, contrails high in the sky showing where F/O. Gibson was awaiting his cue in a R.C.A.F. Sabre. The word was given, and soon after came a superlatively aimed supersonic bang, followed by the aircraft itself, for a show of aerobatics.

Major Christopher ("Underneath the Arches") Draper performed a most circumspect circuit in an Auster and gained a loud and, no doubt, sympathetic cheer for past deeds, or misdeeds.

Parachutist Johnny Ralling did a ten-second delayed drop; he was pulled up with a terrific jerk when the canopy opened, then began to unravel himself from some twisted shroud-lines, eventually landing in the middle of the crowd—which probably pleased them more than it did him.

The individual performer of the Patrouille d'Etampes team, gives Yeadon's crowds the low-down on his Stampe biplane.

The usual impeccable display was given by the Patrouille D'Etampes of the French Air Force, the pilots handling their little Stampe biplanes superbly in conditions that were becoming increasingly gusty.

After an interval, two Fireflies and two Sea Furies of Naval Aviation gave a most impressive demonstration of rocket-assisted take-off. If the spectators were delighted, the airfield officials were less so, for the rockets melted some 800 sq ft of runway surface, rendering it unserviceable.

Appropriately, perhaps, rain now began to fall—though, as at Elmdon, it failed to deter Prince Cantacuzene, who proceeded to make his inverted 15ft-altitude runway flights interspersed with those crazy flick rolls that leave the impression "Did the Jungmeister *really* do that, or did my eyes deceive me?"

After that, the weather put paid to the programme—and a number of visiting aircraft, *Flight*'s Gemini among them, found themselves firmly "clamped" for the night.

W.J.A.C. AT WHITE WALTHAM

CONTINUOUS sunshine drew 20,000 to White Waltham, where the Women's Junior Air Corps staged its national rally and display. The display opened with a march-past by 450 girls—many from points as far afield as Scotland, Devon and Wales—at which Air Marshal H. T. Lydford, A.O.C-in-C. Home Command, took the salute. The Fairchild Argus *Grey Dove*, which since 1947 has given first flights to 6,000 W.J.A.C. girls (twice the present membership) began the flying programme display by leading a loose formation of three Chipmunks with W.R.A.F.V.R. pilots. At a safer height, two cadets demonstrated the useful ground trainer devised locally by Mr. D. Bianchi.

Several noteworthy airwomen took part in the display, including Mrs. Ann Douglas, flying a Slingsby Sedbergh sailplane, and Miss R. M. Sharpe in the 1925 Cirrus Moth G-EBLW. Several other vintage aircraft were on show, notably the Spartan Arrow G-ABWP, Moth Major G-ADHE, and Short Scion G-AEZF. The ultra-light movement was also well represented—by the Zaunkoenig, Motor Tutor, Parasol, Dart Kitten, Drone, Tipsy and Jodel D-9.

The latter type, which is powered by a 25 h.p. Volkswagen engine, but was seen to be capable of a remarkable aerobatic performance, was believed to be making its first appearance in this country. The two examples present were flown from Beauvais *via* Le Touquet by André Rubichon and Georges Crucifix, who eventually circled the airfield in formation, waving cheerfully from their tiny cockpits, before setting off for their four-hour return journey.

All three Services lent their support to the display. Four Firefly 5s of 825 Squadron demonstrated rocket-assisted take-off, and seven Meteor 8s of No. 604 Squadron, R.Aux.A.F., flew past in formation. The display of parachuting from a balloon by Territorials of the 11th Parachute Battalion, and a demonstration by R.A.F. Police dogs, proved to be two of the most popular events. B.E.A. contributed an S-51 helicopter (Capt. Theilmann up), G/C. Slade, of Fairey Aviation, showed off one of the latest Gannets with various combinations of bomb doors open and closed, radome extended and retracted, and airscrews feathered and otherwise.

The final item was performed, appropriately, by a girl—Miss Phyl Weir, who made her 45th parachute descent; the 44th was made only a few hours earlier at Yeadon.

THE FLYING SERVICES IN THE CORONATION PROCESSION

IN the very forefront of the Queen's Procession to Westminster Abbey on the day of her Coronation will be Her Majesty's Honorary Physicians, Surgeons and Dental Surgeons, and one Nursing Sister, Royal Air Force. They are :

G/C. M. J. Pigott; A. Cdre. J. C. Neely, C.B.E.; A. Cdre. C. A. Rumball, O.B.E.; A.V-M. W. E. Barnes, C.B.E.; A. Cdre. F. W. P. Dixon, C.B.E.; Air Marshal J. MacC. Kilpatrick, C.B., O.B.E.; Air Commandant R. M. White, R.R.C.; A. V-M. G. A. Ballantyne, C.B.E., D.F.C.

Next in order of procession come the Chaplains and Honorary Chaplains, Royal Air Force :—

Rev. G. W. N. Groves, A.L.C.D.; Rev. P. J. O'Connell, S.T.L.; Rev. J. R. Appleyard; Rev. A. S. Giles, O.B.E., M.A.; Rev. N. F. Porter, L.T., B.A.; Rev. T. M. Jones, O.B.E., B.A.

These in turn will be followed by the Aides-de-Camp, Royal Air Force :—

Air Commandant N. M. Salmon, O.B.E.; G/C. D. S. Radford, D.S.O., D.F.C., A.F.C.; G/C. E. D. MacK. Nelson, C.B.; G/C. G. C. Eveleigh, O.B.E.; G/C. B. K. Burnett, D.F.C., A.F.C.; G/C. A. C. Kermode, O.B.E.; G/C. R. L. M. Hall, C.B.E.; G/C. G. A. Walker, C.B.E., D.S.O., D.F.C.; G/C. G. D. Stephenson, C.B.E.; A. Cdre. E. N. Lowe, C.B., C.B.E.; A. Cdre. R. C. Mead, C.B.E., D.F.C., A.F.C.; A. Cdre. W. H. Kyle, C.B., C.B.E., D.S.O., D.F.C.; A. Cdre. F. Crerar, C.B.E.; A. Cdre. F. J. A. Tanner.

After similar representations by the Regular and Territorial Army, the Royal Navy, Royal Marines and Women's Royal Naval Service, there will come the Band of the Grenadier Guards and the Corps of Drums of the 1st Battalion, Grenadier Guards. Then follow these members of the Air Ministry Staff :—

A.V-M. L. J. V. Bates, C.B., C.B.E.
A.V-M. Sir Harry Broadhurst, K.B.E., C.B., D.S.O., D.F.C., A.F.C.
A.V-M. W. L. Dawson, C.B., C.B.E., D.S.O.
Air Marshal R. O. Jones, C.B., A.F.C.
A.V-M. Sir Francis J. W. Mellersh, K.B.E., A.F.C.
A.V-M. G. R. Beamish, C.B., C.B.E.

Then, after War Office and Admiralty Staffs, and Senior Officers of the Armed Forces of the Commonwealth, come the Deputy Supreme Commander (Air), Air Officers Commanding-in-Chief and Inspector-General :—

Air Marshal Sir Dermot A. Boyle, K.B.E., C.B., A.F.C.
Air Marshal L. G. Harvey, C.B.
Air Marshal L. F. Pendred, C.B., M.B.E., D.F.C.
Air Marshal G. H. Mills, C.B., D.F.C.
A.V-M. C. E. N. Guest, C.B., C.B.E.
Air Marshal Sir Victor E. Groom, K.B.E., C.B., D.F.C.
Air Marshal Sir Basil E. Embry, K.C.B., K.B.E., D.S.O., D.F.C., A.F.C.
Air Chief Marshal Sir Hugh W. L. Saunders, K.C.B., K.B.E., M.C., D.F.C., M.M.
Air Marshal Sir Alick C. Stevens, K.B.E., C.B.
Air Marshal H. T. Lydford, C.B., C.B.E., A.F.C.

Next in order follow General Officers Commanding-in-Chief Home Command, General Officer Commanding Northern Ireland District, and Flag Officers Commanding-in-Chief, Home Commands; and after them marches the Air Aide-de-Camp—Air Chief Marshal Sir John W. Baker, K.C.B., M.C., D.F.C.—together with Aides-de-Camp General. Thereafter, in three carriages, ride the Marshals of the Royal Air Force. In the first carriage:—

Sir John C. Slessor, G.C.B., D.S.O., M.C.
Sir Arthur T. Harris, Bt., G.C.B., O.B.E., A.F.C.
The Lord Douglas of Kirtleside, G.C.B., M.C., D.F.C.
The Lord Tedder, G.C.B.

In the second carriage :

The Viscount Portal of Hungerford, K.G., G.C.B., O.M., D.S.O., M.C.
Sir Edward L. Ellington, G.C.B., C.M.G., C.B.E.
Sir John M. Salmond, G.C.B., C.M.G., C.V.O., D.S.O.

In the third carriage :

Marshal of the Royal Air Force The Viscount Trenchard, G.C.B., O.M., G.C.V.O., D.S.O. (with
Field Marshal The Lord Wilson of Libya, G.C.B., G.B.E., D.S.O.).

Next in order of procession come the Field Marshals and Admirals of the Fleet. Then the Air Council Air Members :—

Air Marshal Sir John N. Boothman, K.B.E., C.B., D.F.C., A.F.C.

Air Chief Marshal Sir William F. Dickson, G.C.B., K.B.E., D.S.O., A.F.C., Chief of the Air Staff, who takes his place in Her Majesty's Procession with General Sir John Harding and Admiral Sir Rhoderick McGrigor.

Air Marshal Sir Francis J. Fogarty, K.B.E., C.B., D.F.C., A.F.C.
Air Chief Marshal Sir John W. Jones, K.C.B., C.B.E.
Air Marshal Sir Ronald Ivelaw-Chapman, K.B.E., C.B., D.F.C., A.F.C.

These officers are followed by the Army Council—Military Members, the Board of Admiralty—Sea Lords, and the Chiefs of Staff, United Kingdom, of whom one is :—

Air Chief Marshal Sir William F. Dickson, G.C.B., K.B.E., D.S.O., A.F.C.

On the return journey from the Abbey to Buckingham Palace the Procession will be augmented by detachments from the Defence Forces of the Commonwealth and Colonies, and contingents of the three Services of the United Kingdom. These additional representations will include detachments from :—

Hong Kong Auxiliary Air Force, Malayan Auxiliary Air Force (Federation Section), Malayan Auxiliary Air Force (Singapore Section), Aden Protectorate Levies, Southern Rhodesia Auxiliary Air Force, Southern Rhodesia Women's Military and Air Service, Southern Rhodesia Air Force, Royal Ceylon Air Force, Royal Pakistan Air Force, South African Air Force, Royal New Zealand Air Force Reserve, Royal New Zealand Women's Auxiliary Air Force, Royal New Zealand Air Force (Regular and Territorial), Royal Australian Air Force, Royal Australian Air Force Active Reserve, Citizen Air Force, Women's Royal Australian Air Force, Royal Australian Air Force Nursing Service, Royal Canadian Air Force, commanded by W/C. J. V. Watts, D.S.O., D.F.C.

Behind these detachments will follow No. 1 and No. 2 Regional Bands, Royal Air Force, which precede the main R.A.F. contingent, made up as follows :—

The Officer Commanding the Contingent, A. Cdre. B. C. Yarde, C.B.E. Detachments from: Royal Air Force Volunteer Reserve, Royal Auxiliary Air Force, Royal Air Force Reserve of Officers, Women's Royal Air Force, Princess Mary's Royal Air Force Nursing Service, Royal Air Force Police, Royal Air Force Regiment, Overseas Commands, 90 Group, Home Command, Maintenance Command, Transport Command, Technical Training Command, Flying Training Command, Coastal Command, Fighter Command, Bomber Command.

Then follow the main Army contingent (which includes the Royal Air Force College Band and Royal Air Force Regiment Band), and a contingent of the Royal Navy and Royal Marines, including Naval Aviation—or the Fleet Air Arm (as announced on p. 710, there is to be a reversion to the former title).

Over 4,500 R.A.F. personnel will line parts of the Coronation route. Most of them will be on the section through Oxford Street, Regent Street and Haymarket, and they will include 127 officers and 3,840 airmen.

From the junction of Portman and Park Streets with Oxford Street, both sides of the route, as far as Oxford Circus, will be lined, in progressive sections, by personnel of Bomber, Fighter, Coastal and Flying Training Commands. Both sides of the major length of Regent Street will be manned by Technical Training Command, with Transport Command at the lower end and Maintenance Command across Piccadilly Circus and into Haymarket. Home Command will line the middle sector of Haymarket, with 90 Group at the lower end.

Bands and Colours will be positioned as follows: H.Q. Fighter Command Band—Balderton Street (Oxford Circus); Bomber Command Band from Scampton—Woodstock Street (Oxford Street); No. 4 Regional Band from Henlow—east side, Oxford Circus; Halton Apprentices Band, and the Queen's Colour of No. 1 School of Technical Training, with the Apprentices Squadron—New Burlington Place (Regent Street); No. 5 Regional Band from Locking—Piccadilly Circus; Technical Training Command Band from Hednesford—Morris Street (Haymarket).

Eight cadet under-officers and 208 flight cadets of the Royal Air Force College, Cranwell, will line the north side of Parliament Square, Westminster, and part of the west side.

FROM ALL QUARTERS

Oslo to Tokyo—Over the Top

ON Saturday last, May 23rd, a DC-6B of Scandinavian Airlines System was due to begin a flight from Oslo (Gardermoen) to Tokyo by way of Greenland (Thule), Alaska (Anchorage) and the Aleutians (Shemya). This, the first such flight to use the Northern Great Circle route, follows the two experimental flights from Los Angeles to Scandinavia made by S.A.S. last autumn. The aircraft was chartered by the Norwegian Defence Department, and was to carry some 40 relief personnel to the Norwegian field hospital in Korea.

The direct Northern Great Circle route from Europe to Tokyo crosses Siberia and, because of the Russian prohibition of flight over this territory, the S.A.S. journey had to be made by way of Alaska and the Aleutians. The four stages of the flight are, respectively, of 1,821, 1,778, 1,296 and 1,788 n.m. length and total flying time is 33 hours.

During the leg from Thule to Anchorage, and owing to the impossibility of using magnetic compasses, the aircraft was to be controlled by the Bendix Polarpath gyro system. Aids to navigation are few, and consequently the sun has to be relied on for the checking of gyros and also for position-lines. At one point of the flight, the aircraft's position would be 220 n.m. north of the magnetic Pole, and at the same time, 780 n.m. south of the geographical Pole.

The aircraft was scheduled to leave Tokyo on May 27th, returning to Scandinavia by way of Okinawa, Bangkok, Rangoon, Karachi, Cairo, Rome, Geneva, and Frankfurt. It is due to arrive in Stockholm at 1835 hours today, May 29th.

Traffic on British Airlines

BETWEEN 1950 and 1951, passenger traffic on United Kingdom airlines increased by 34 per cent, and freight and mail traffic by 27 per cent. Last year the number of passengers was 15 per cent more than in 1951, freight traffic declined slightly and mail rose by only 7½ per cent. Introducing British airline statistics for 1952, the M.C.A. gives the following reasons for the slower rate of air-traffic expansion: ". . . the restrictions on services due to the U.S. fuel strike, political disturbances, particularly in the Middle East, the reduced allowance of currency for foreign travel, and import restrictions in Australia and South Africa, coupled with some slowing down in the rate of expansion of internal trade."

The division of traffic between the State Corporations and independent carriers operating scheduled services under "associate agreements" is shown clearly by the following figures for the calendar year 1952. Number in parentheses refer to the percentage change over the 1951 figures, except in the case of load-factors, where the actual results for 1951 are quoted. Weights are given in short tons.

	B.O.A.C.	B.E.A.	Associates
Miles flown ...	31,600,000 (6.6)	23,537,000 (10)	2,497,000 (74)
Pass. flown ...	267,000 (11.7)	1,338,000 (19.3)	95,000 (74.3)
Freight flown	6,000 (−1.9)	16,000 (19.2)	15,000* (−16.3)
Mail flown ...	3,000 (9.1)	6,000 (4.6)	19 (40.6)
C.t.m. ...	199,285,000 (8.6)	66,075,000 (18.1)	5,141,000 (61.2)
O'all load-f'tor	64.7 (65.2)	62.6 (63.9)	63.7 (59.4)
Av. seat-miles	1,320,200,000 (10.7)	552,404,000 (19.7)	37,235,000 (112.9)
Pass. load-f'tor	64.2 (62.7)	64.6 (66.3)	67.6 (62)

* Includes vehicles and passengers carried on car-ferry services.

The New D.G.T.D. (Air)

AS we recorded in *Flight* of April 24th, Mr. S. Scott Hall is leaving the post of Director-General of Technical Development (Air), Ministry of Supply, in order to take up the appointment of Head of Technical Services, British Joint Services Mission, Washington. It is now announced that his successor is to be Mr. G. W. H. Gardner, C.B.E., B.Sc., M.I.Mech.E., F.R.Ae.S., who will assume his duties on July 5th. Since 1945 Mr. Gardner has been principally associated with guided-missile development, first as head of the Controlled Weapons Department, R.A.E., then as Director, Guided Weapons (R. and D.), Ministry of Supply (1947-51) and finally as Principal Director, Guided Weapons. He had received his early engineering training with Harland and Wolff, Belfast, in 1919-25, and thereafter held a number of research posts at Farnborough and in the Air Ministry and M.A.P.

Mr. G. W. H. Gardner.

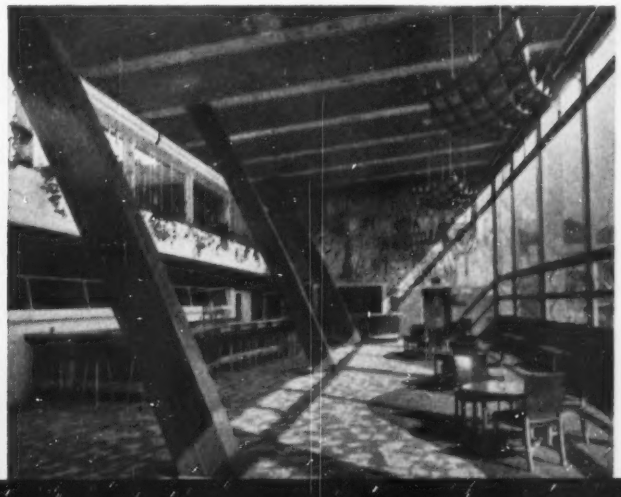
B.E.A.'s New Terminal

ON Tuesday, May 19th, B.E.A. began using their spacious and attractive new London terminal building at Waterloo, which now replaces Kensington Air Station as the gathering point for passengers of the Corporation and several other airlines: Aer Lingus, Air France, Iberia, Sabena, S.A.S. and Swissair. In addition, two British independent operators (Hunting Air Transport, Ltd. and B.K.S. Aerocharter, Ltd.) are making use of the new terminal facilities. The change-over from Kensington was effected very smoothly and the first airport coach left Waterloo on schedule at 7.16 a.m. on May 19th. The official opening by Mr. A. T. Lennox-Boyd, Minister of Civil Aviation, took place two days later. Among those present were Lord Douglas, chairman of B.E.A., and the newly-elected Mayor of Lambeth.

Connected by escalator with Waterloo underground station and adjoining the main-line railway station, the new terminal is also within reasonable distance of Charing Cross and Victoria stations. B.E.A. believe that its central location will more than offset the extra time (20 minutes) taken by coaches on their journeys to Northolt and London Airports.

In addition to being more accessible to the majority of passengers, the new terminal is capable of handling far greater numbers of travellers than its predecessor. The peak hourly rate of dispatch was previously 20 flights and 650 passengers, whereas Waterloo should be capable of handling 60 flights (2,000 passengers) in an hour. Larger numbers of passengers are now tending to make their own way to the airport, and it is estimated that the Waterloo Air Terminal's ability to dispatch 6,000 passengers a day should prove adequate for at least five to seven years. The parking problems which arose at Kensington are unlikely to occur at Waterloo, since the adjoining space can

JOURNEY'S END—OR BEGINNING: The departure-bay and the refreshment-room and bar at the new B.E.A. London terminal—referred to above—near Waterloo Station. Contemporary interior decoration gives a particularly fresh and airy appearance to the interior.



"Flight" photograph

HOMECOMING: Comet G-ALYT, Avon-powered development aircraft for the Series 2, returned to Hatfield on May 20th from tropical trials at Khartoum and Entebbe. Block speeds of 439 m.p.h. and 414 m.p.h. respectively were achieved on the over-2,000-mile Entebbe-Cairo and Cairo-Hatfield stages. Disembarking are John Cunningham and co-pilot Peter Bugge (left); between them is George Jones, Mr. Cunningham's assistant. The Comet is seen to have an extra wing-fence, one elliptical window (as envisaged for the Series 3), modified intakes, black lines to assist photographic performance measurements, and newly applied B.O.A.C. markings.

FROM ALL QUARTERS . . .

accommodate up to two dozen of the new 37-seat B.E.A. coaches.

Traffic difficulties expected at Waterloo during Coronation Day, June 2nd, are being avoided by the use of the White City stadium as a temporary terminal for that day's flights.

The work of converting the former Station Gate building on the Festival of Britain site into B.E.A.'s new terminal, at a cost of some £90,000, began in October last. Arrival and departure halls and numbered exit gates have been added, together with a public address system, banking and hotel booking facilities, a bookstall and a shop, and the attractive "Rocket restaurant" of festival days has been converted into a licensed buffet and lounge.

An Honoured Title Revived

NAVAL AVIATION is to revert to its former title of "Fleet Air Arm." This news—which is certain to be welcomed by many—was contained in a written Parliamentary answer on May 20th. The announcement was in reply to questions by Cdr. R. A. Langford-Holt, R.N. (Con., Shrewsbury), who for many months has been pressing for reversion to the old title.

The reply, given for the First Lord by Cdr. Noble, Parliamentary Secretary to the Admiralty, said that the term "Naval Aviation," which was used at present, had the merit of emphasizing that those specially concerned with flying in the Royal Navy were an integral part of it. While still adhering to this concept, the Admiralty had nevertheless considered the revival of the name "Fleet Air Arm" and had now decided that it should be re-introduced. In reaching this decision, the Admiralty had been greatly influenced by the strong appeal which this title, with its glorious wartime associations, made to many of the Naval aviators of today and to many members of the public.

By a coincidence, it was on the same day, May 20th, at Lee-on-Solent, that H.R.H. the Duchess of Kent unveiled a memorial to 1,931 officers and men of the Fleet Air Arm who, between 1939 and 1945, "died in the service of their country and have no grave but the sea." These are the words on the Portland stone central column of the memorial, which is flanked by Westmorland-slate panels on which are carved the names of those commemorated.

Hayhow's Aiglet Sighted

ACCORDING to reports from Vienna last Monday, the Aiglet in which Tom Hayhow was attempting to set up a London-to-Belgrade record last April 10th has been sighted by skiers. The position, roughly on track, is on Rabenstein mountain, twenty miles south of Salzberg. The aircraft is apparently on its back, not much damaged.

The National Air Races Course

AFTER last week's issue had closed for press we learned from the Royal Aero Club that their map of the National Air Races course (reproduced on page 640 of that issue) had been found to contain a transposition of two mileage figures. The length of the southernmost leg should, in fact, be 4.46 miles and that of the other long leg 4.37 miles.

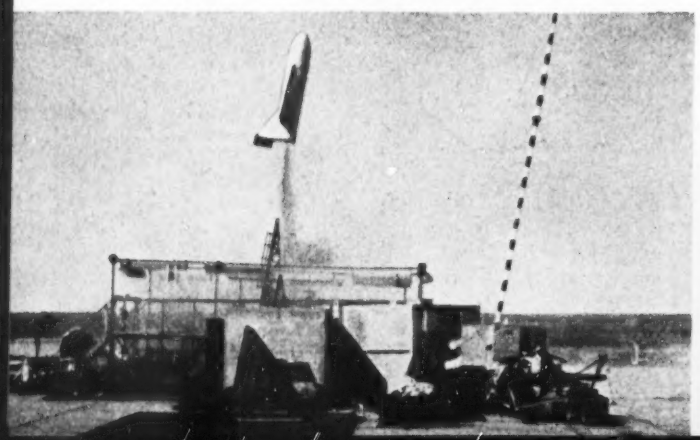
The Duke at Hawkers

AS briefly reported last week, H.R.H. the Duke of Edinburgh visited the Hawker Aircraft factories at Kingston on Tuesday, May 19th, and in the afternoon he drove a new Armstrong Siddeley Sapphire car to Dunsfold to see several types demonstrated at the airfield. Contrast was provided by the line-up in front of the control tower of earlier Hawker designs beside a production Sea Hawk and—an encouraging sight—three Hunters. The wind was rather too strong for the tiny Cygnet of 1924 vintage, but Frank Bullen flew the Tomtit, Frank Murphy the Sea Hawk, Don Lucey the Hurricane and Bill Bedford the Hart. The individual performances were rounded off in a most spectacular manner by Neville Duke, who produced a well-aimed two-bang salute, and then flew past very low at all of 700 m.p.h.

Later in the afternoon a few guests at Dunsfold were privileged to witness the very first formation flight of Hunters. In fact, it was the first occasion upon which three had been in the air at once. The machines concerned were a 1067 prototype WB 195 (flown by Bullen); the Sapphire-powered Mark 2, WB 202 (Murphy up); and the first production machine WT 555, locally referred to as the "State Express," in which Neville Duke led the formation. Before the take-off of the first production machine the Duke of Edinburgh drew aside his personal standard, which had been draped over the aircraft, to reveal his crest painted on the nose. A fourth Hunter, is now being equipped with reheat.

Seen between gaps in the towering cumulus cloud over Dunsfold, the vic formation of Hunters made a truly moving spectacle. Their beauty of form was seen to the best advantage as the bright sun provided highlights, and the machines themselves appeared as silver-white silhouettes against a blue-black sky. Few of us have yet appreciated the terrific advance in performance that these aircraft offer. On their individual climbs from take-off and later as a formation, all three sweeping round the sky, they made earlier jet types seem very slow. *Flight's* photographer was fortunate to be airborne over Dunsfold in the well-known old Hart G-AMBR at the same time as the Hunters; and in spite of the discrepancy in speed he was able, as they passed, to obtain a few memorable aerial shots, of which one is reproduced on page 704.

VERTICAL TAKE-OFF, as demonstrated at Woomera by the Fairey V.T.O.: this is the first action-picture released. The striped post is to assist in recording initial acceleration, provided by two 600lb-thrust booster rockets. Main power is from the two 900lb-thrust chambers of the Fairey Beta I unit.



AT DUNSFOLD: The Duke of Edinburgh chats with Hawker Siddeley executives—Sir Frank Spriggs, Mr. Neville Spriggs and Mr. Sydney Camm. On the day after his visit—described above—the Duke toured several English and Canadian fighter stations, and on the following day made a ten-hour tour of U.S.A.F. bases.

The jet age

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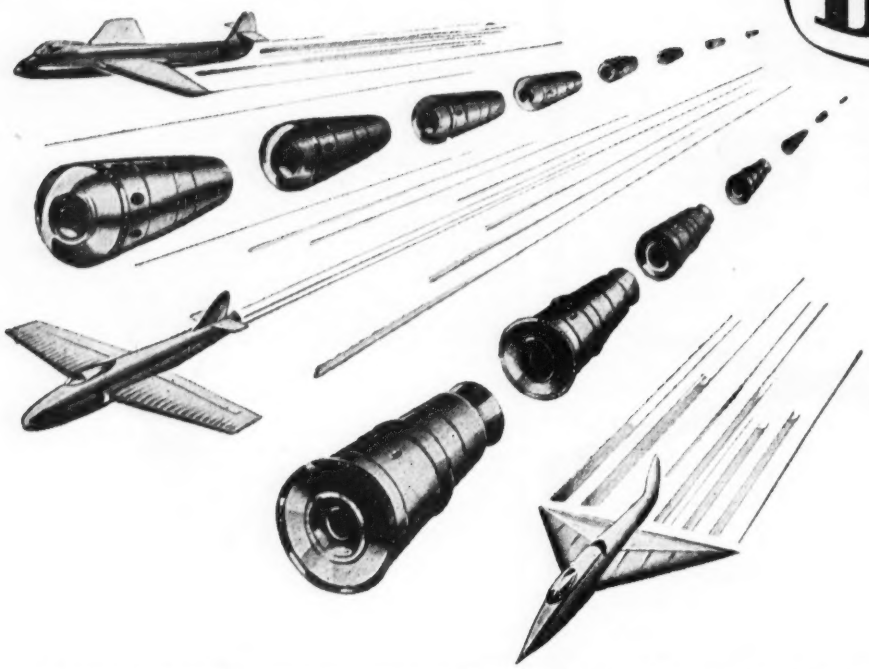

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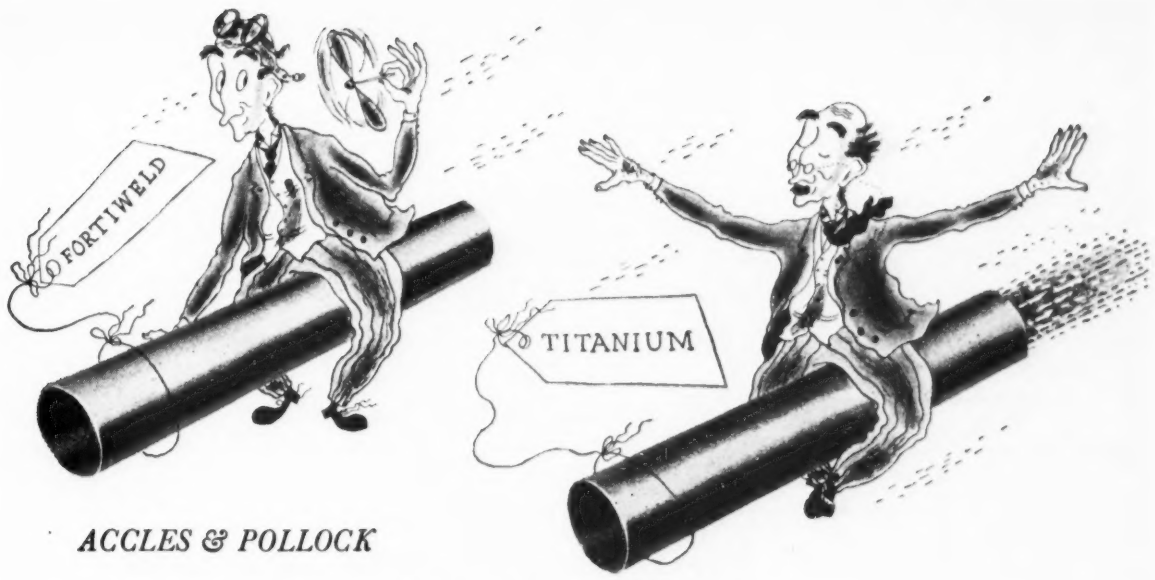

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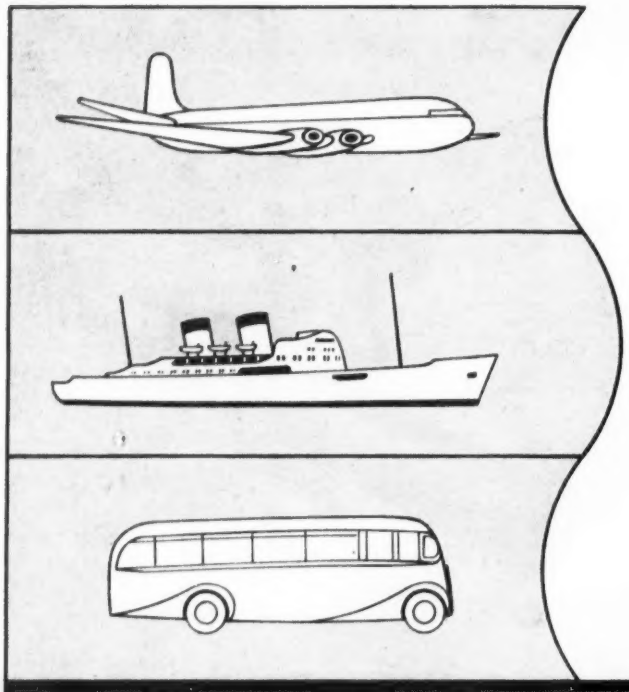

in the air

across the seas

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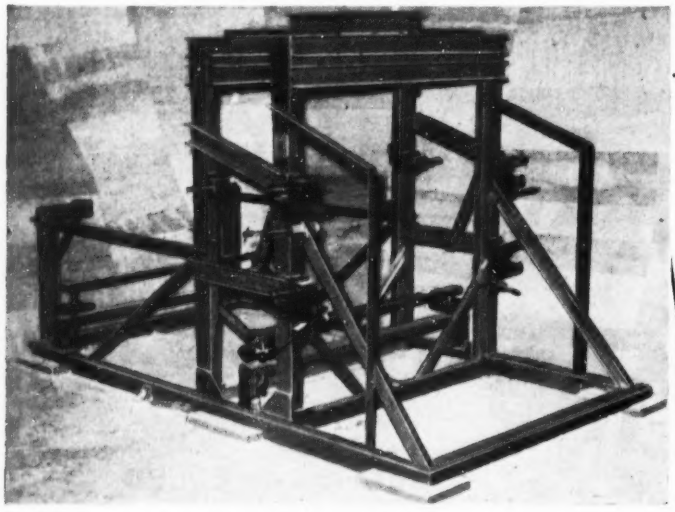

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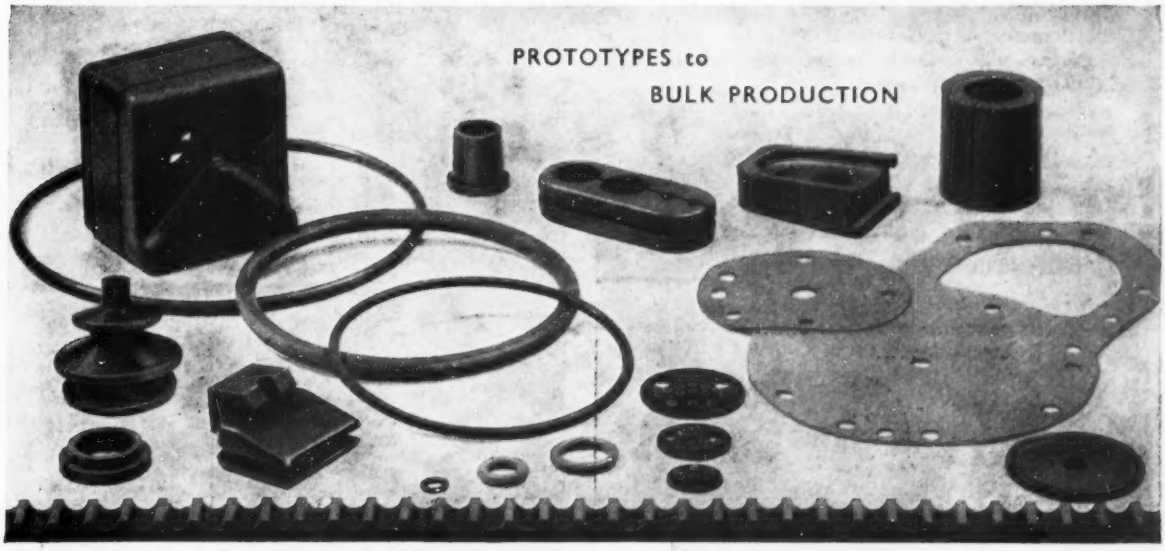

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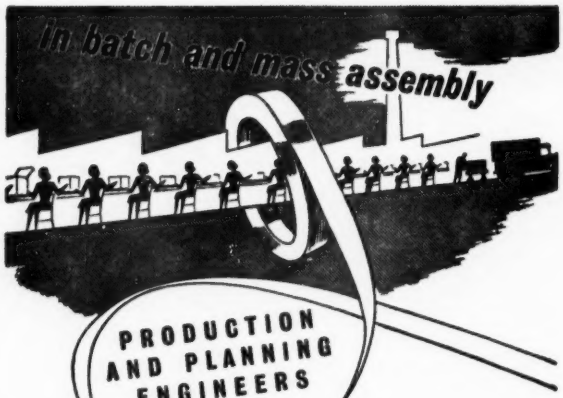

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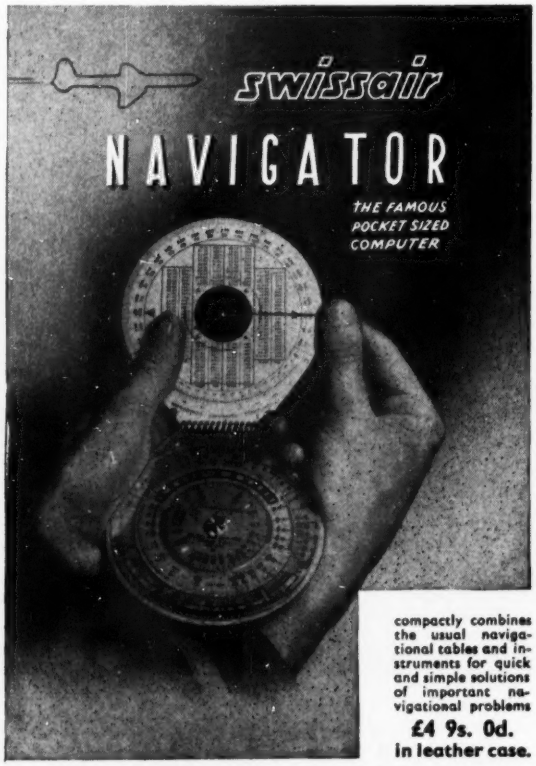

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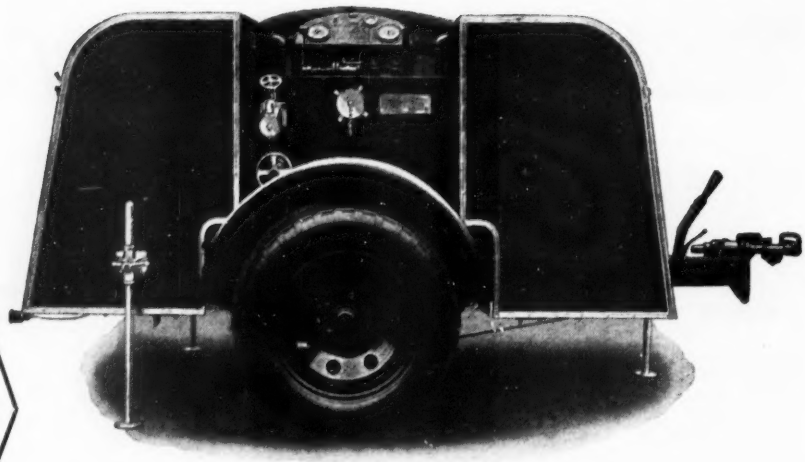

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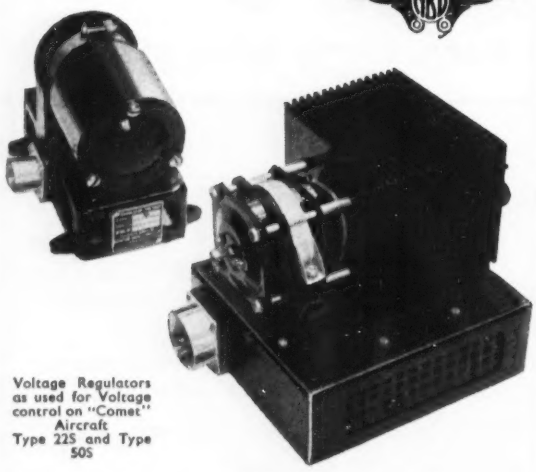

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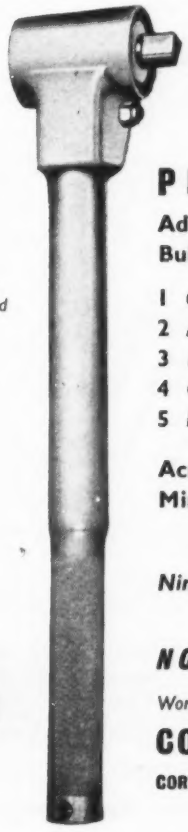

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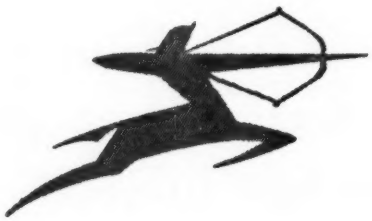

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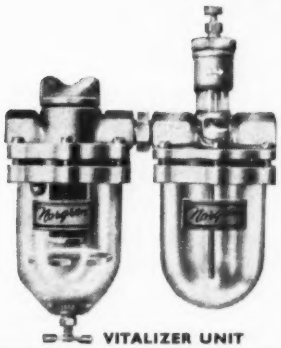

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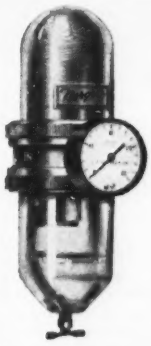

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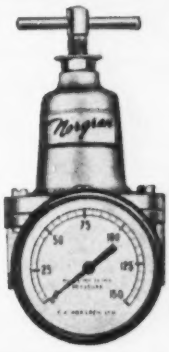

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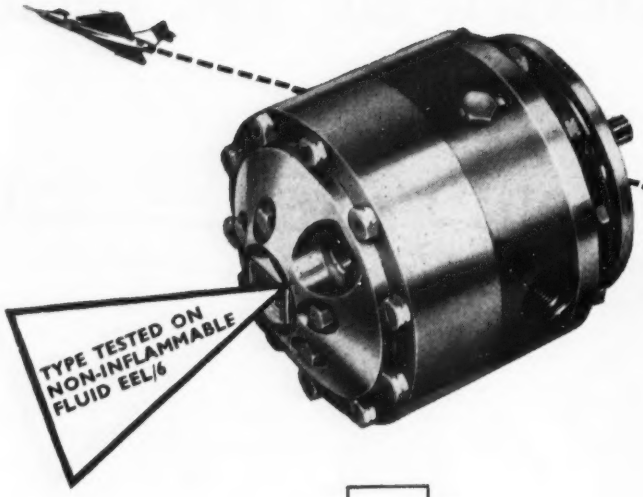

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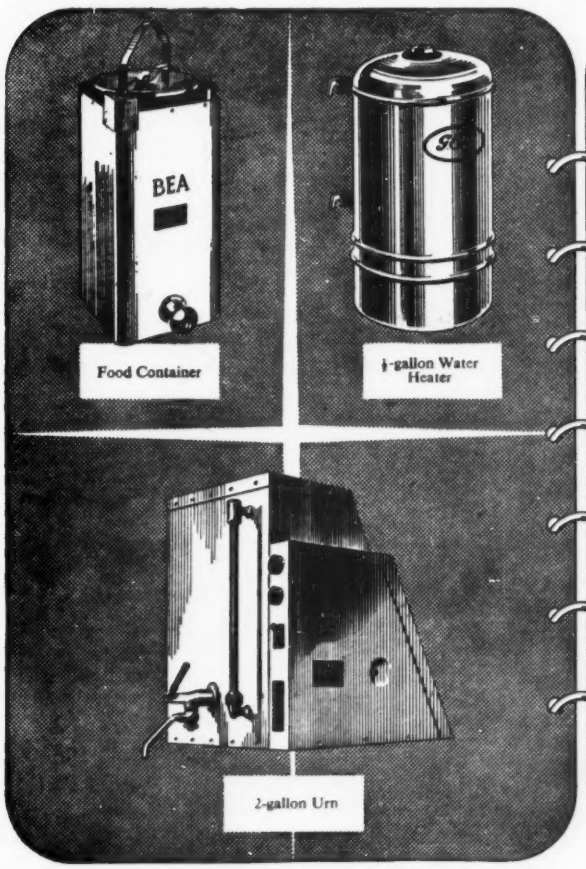

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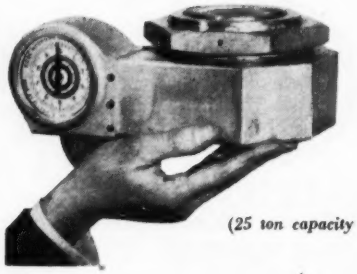

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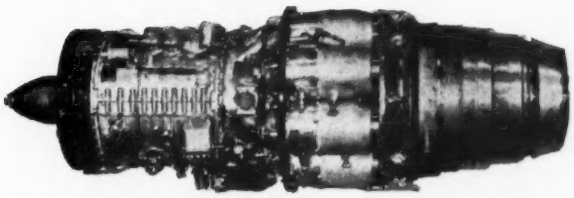

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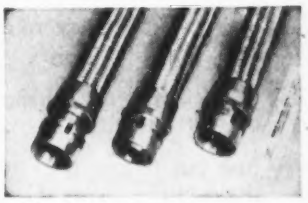

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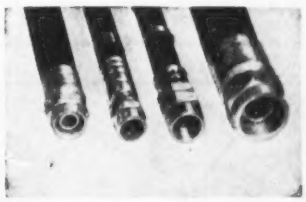

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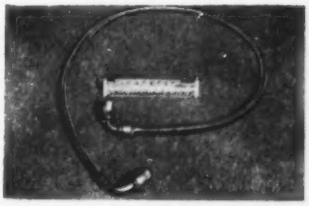

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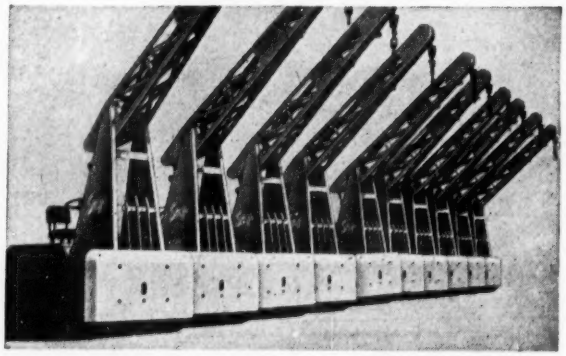

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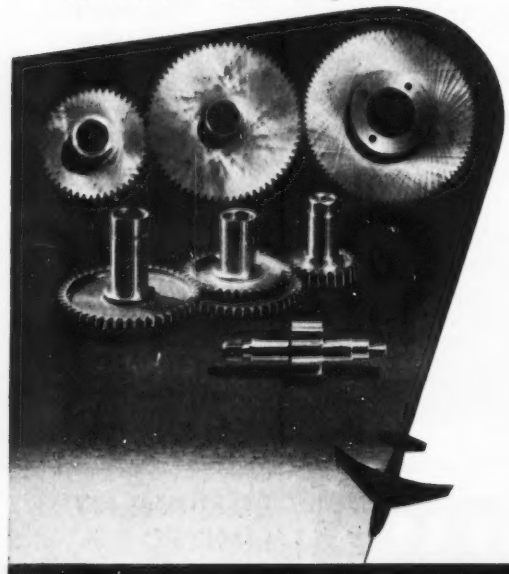

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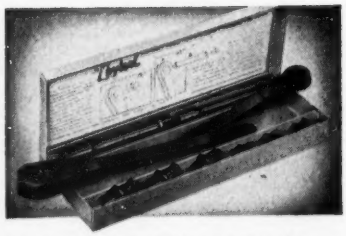

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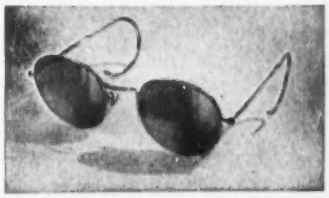

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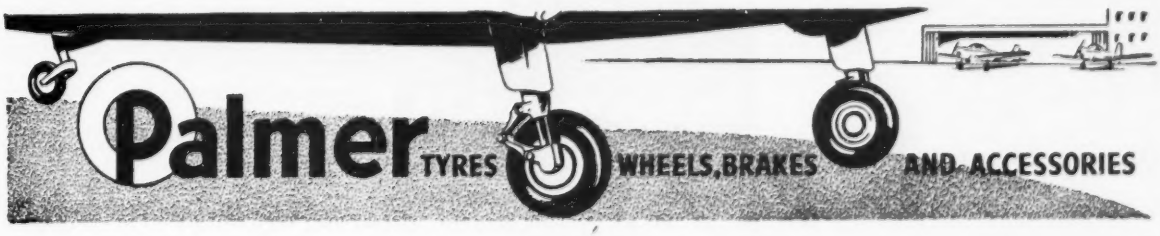

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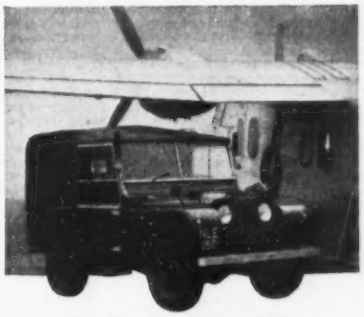

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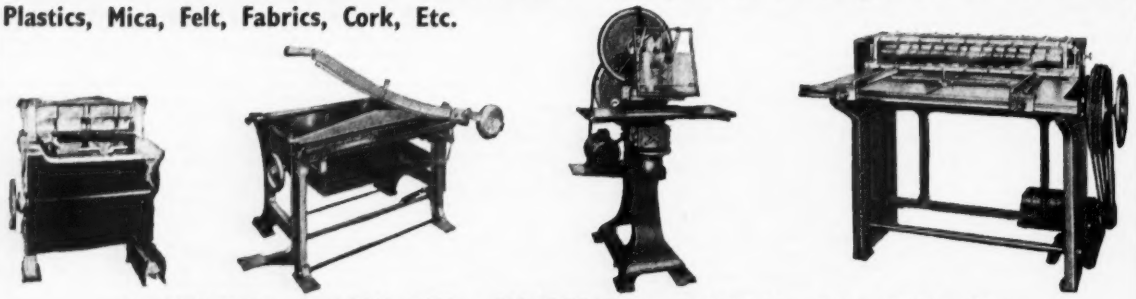

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